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MULTIPLE CARCINOMA OF THE COLON

Report of a Case

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J. D. Martin, Jr., M.D.
Atlanta

Patients who have been operated upon for malignant growths, or who have symptoms of malignant disease, should be examined for the possibility of multiple lesions. These lesions may be present simultaneously or a second lesion may appear following removal of the first.

The incidence of multiple lesions of the colon is from 0.6 to 4.3 per cent.[1] Multiple malignancy of the large intestine is most often associated with a diffuse polyposis which is considered a factor in the disease process.[2] The case reported here demonstrates the development of a second carcinoma of the colon without evidence of polyps. The patient was free of symptoms for 14 years after resection of the colon for the first lesion, before symptoms of the second lesion appeared.

Case Report

Mrs. R. W., white, aged 49, was first seen on Aug. 7, 1933, complaining of pain in the lower abdomen and bleeding from the rectum. Nine months prior to examination she first noticed a small amount of bleeding from the rectum during defecation. The bleeding became more severe with the use of laxatives, on which she increasingly depended to obtain satisfactory bowel movements. The pain became worse and localized in the lower abdomen on either side, more often on the right. These symptoms continued until 6 weeks prior to admission when they suddenly became more severe. She had recently lost 5 pounds in weight.

Physical examination revealed a mass in the lower abdomen, which felt like a full colon. A second mass, moderately tender, was felt in the region of the

From the Whitehead Department of Surgery, Emory University, Georgia.

sigmoid. A barium enema revealed an obstructive lesion in the descending colon.

Operation was performed Aug. 10, 1933. A movable mass was felt to be part of and arising from the descending colon near the splenic flexure. This was resected and an end-to-end anastomosis performed. The lesion was a fungating papillary growth involving the colon, with no evidence of local or distant metastasis. Microscopic examination revealed an adenocarcinoma, Grade III to IV.

Two days after operation, the patient had a chill, and her temperature rose to 105° F. On the fourth day a second chill occurred, and an area of induration in the left flank was felt. This was incised and a large quantity of pus

Fig. 1. Roentgenogram of barium enema showing complete obstruction in the sigmoid colon.

and fecal material was obtained. The abscess continued to drain feces for approximately 3 months and then healed spontaneously. The patient's bowels were moving satisfactorily on dismissal from the hospital, and she had gained weight.

The patient was free of symptoms until December, 1946, when she began to have a feeling of fullness in her abdomen, gas, and an occasional attack of diarrhea. There was no bleeding from the rectum.

A barium enema in September, 1947, revealed an obstruction in the sigmoid with practically no barium passing that point (fig. 1). On examination there was a moderate amount of distention in the abdomen, but no masses could be felt. Proctoscopic examination was negative. Prior to operation she was given .25 Gm. of sulfasuxidine per kilo of body weight daily for 6 days, and two 500 c.c. transfusions of blood.

Operation was performed Sept. 23, 1947. The peritoneal cavity was free of adhesions except for the upper sigmoid, which was attached to the lateral abdominal wall at the site of the previous lower flank drainage. A mass was felt in the sigmoid colon about 5 inches below the site of the previous anastomosis. This was within the sigmoid loop, which was freely movable. There

were several small nodes in the mesentery of the sigmoid; no other nodes were seen. No metastases were felt in the liver. After complete mobilization of the sigmoid colon, resection was done with end-to-end anastomosis. One gram of streptomycin was placed in the peritoneal cavity and the abdomen was closed without drainage. During the operation the patient received 1,000 c.c. of blood. She was placed on streptomycin, .2 Gm. every 3 hours for 4 days postoperatively. Forty thousand units of penicillin were given intramuscularly every 3 hours for 6 days.

Fig. 2. Photograph of resected tumor and colon showing the papillary-type growth which completely encircled the wall of the colon.

The lesion was a fungating, papillary growth, 7 by 2 cm., encircling the sigmoid and occluding its lumen (fig. 2). Microscopic examination showed this to be an adenocarcinoma, Grade III to IV. The adjacent mesenteric lymph nodes showed chronic inflammation with no evidence of malignancy.

The patient's postoperative course was satisfactory. The highest temperature was 99° F. on the second day, and was normal the remainder of her stay. The bowels moved on the fourth day following operation, and the patient was allowed to leave the hospital on the twelfth postoperative day.

One year after operation she had had no further symptoms.

Discussion

At the first operation, an active papillary adenocarcinoma was removed and following a stormy convalescence complete recovery took place. The patient was free of symptoms from 1933 to 1947, when indications of intestinal obstruction again developed. Roentgenographic examination revealed a similar obstructive lesion ap-

proximately 6 inches from the site of the previous malignant growth. A second operation was performed with an end-to-end anastomosis, followed by recovery. The growth was separate from the site of the previous anastomosis but involved the wall of the intestine similarly to the first lesion. It is believed that this was not a recurrence but a separate lesion. In view of the gross characteristics of the tumor, it is felt that this arose from a polyp, although repeated barium enemas did not show one.

This patient should be observed most carefully for further development of malignant growth within the colon.

It is interesting to compare the convalescence following the two operations. The first was stormy, prolonged, and accompanied by abscess formation. This occurred prior to the development of our present day chemotherapy. Sulfasuxidine was administered prior to the second operation; streptomycin and penicillin were given postoperatively. The convalescence was uneventful.

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ANURIA*

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ANURIA, which is defined as a complete cessation of urine formation, is practically always preceded by oliguria or the secretion of small amounts of urine. For practical purposes, patients are considered to be in an anuric state when their urinary secretion falls below 100 c.c. for a 24 hour period.

Any degree of anuria developing during the course of any illness, whether medical or surgical or occurring as a result of an accident, is a serious condition, and it is essential that the cause or causes for its occurrence be carefully considered in order to apply the proper therapy.

The diagnosis and management of anuria have become much more important during recent years because of the introduction of the sulfonamides, and the more common employment of blood transfusions. One of the most serious untoward reactions to the use of these drugs has been anuria, and death from anuria commonly follows a transfusion reaction, secondary to damage of the renal tubular epithelium.

The crush syndrome is a condition that we see rather commonly in private practice and which was carefully studied by several English investigators during the bombing raids of London. These crushing injuries produce the same clinical picture, with anuria and with almost identical pathologic changes in the kidneys, as is seen following transfusion reactions.

Renal damage as a complication of burns is common, and the anuria which follows is a primary contributing factor to the cause of death. Anuria following ingestion of certain chemicals, notably bichloride of mercury, is a serious condition, in most instances fatal, and the renal changes are not unlike those produced by sulfonamide, transfusion reaction, crush syndrome, and burns.

The vast majority of all cases of anuria develop as a rule from a combination of factors, which always makes the diagnosis and management more difficult. The etiologic factors concerned in anuria may be classified into four main groups.

Group 1 is the circulatory or pre-renal form, which is characterized by an inadequate blood volume and pressure. The most important contributing factors are a diminished fluid intake, which is

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*Clinical lecture delivered at the Kansas City Southwest Clinical Society, Oct. 6-9, 1947.

commonly seen, particularly in the patient who is carrying a high or prolonged fever, and the loss of certain blood constituents through hemorrhage, vomiting, excessive perspiration, or diarrhea.

The most common type of anuria which we see following low blood pressure is that after shock from surgical operations or from trauma.

It is generally estimated that in the normal individual the glomerular blood pressure in the kidneys is about 90 mm. of mercury, therefore about 30 to 40 mm. less than the person's arterial blood pressure. Consequently, if the arterial blood pressure falls below 70 to 90 mm. of mercury for any prolonged period of time, following or during the course of a surgical procedure, filtration will not take place in the renal glomeruli, and the urinary secretion fails. Failure of urinary secretion is more apt to occur after the kidney has been previously damaged by some pathologic process.

The sudden fall of blood pressure, which unfortunately occurs in some individuals during spinal anesthesia, may result in an anuria even though the operation is not a particularly shocking one. It is essential, therefore, in order to maintain renal function during or following surgical operations, that the ensuing shock be combated by the restoration of blood volume, preferably by the use of whole blood or plasma and an adequate fluid intake through the administration of isotonic glucose solution.

Group 2 may be classified as excretory or renal, chiefly on the basis of an inadequate amount of secreting renal tissue. In this group are the nephritides, the acute nephroses, and the occasional cases in which the remaining kidney following nephrectomy does not have sufficient function to maintain life.

Group 3 is the eliminatory or post-renal or obstructive type. In this group we find cases of bilateral ureteral calculi, unilateral ureteral calculi with reflex inhibition of the unaffected side, and calculi blocking the ureter of a single kidney. In this group also may be placed the intrarenal type of obstruction due to blockage of the tubules by precipitated sulfonamide crystals or by hemoglobin crystals produced by blood transfusion reactions, by burns, or following malaria or the ingestion of certain drugs.

In this group may be found a most important number of cases classified as extrinsic ones. The most common cases are caused by injury or ligation of one or both ureters during pelvic operation in the female. When anuria develops following a pelvic operation in the female, it is imperative that cystoscopic examination and ureteral catheterization be done immediately to rule out injury or liga-

tion of one or both ureters, rather than to assume, as is most commonly done, that the anuria has developed as a result of failure of urinary secretion.

Group 4 comprises the composite or mixed type. It includes those cases where more than one of the circulatory, secretory, or excretory factors are present. In this group may be placed the cases of injuries to the kidneys and ureters. Cases of the crush syndrome may also be included in this group, since the true mechanism of anuria in these latter cases is not definitely known. Destruction of renal tubular epithelium and the deposition of myohemoglobin crystals do occur, and it is also suggested that renal failure occurs as a secondary manifestation of shock, due to a loss of substances from the circulation into the affected limb. In this group may be placed cases of extensive burns. The same series of events as in the preceding occur: burn, shock, anuria, and death.

The following case is illustrative of this latter group:

CASE 1. C. D., a 52 year old woman, underwent a laminectomy for a ruptured nucleus pulposus in November, 1946. Bleeding was rather difficult to control, and her blood pressure during the last hour of the operation was recorded in most instances as 70/50. During the operation she received 1,000 c.c. of 5 per cent glucose solution, 500 c.c. of whole blood, 250 c.c. of plasma, and 500 c.c. of saline. During the remainder of the day she received an additional 500 c.c. of whole blood followed by 500 c.c. of saline and an additional 1,000 c.c. of 5 per cent glucose solution. During the next 4 days she received daily an average of 3,000 c.c. of fluids parenterally. The daily output of urine never exceeded 100 c.c. On the fourth postoperative day my associate and I

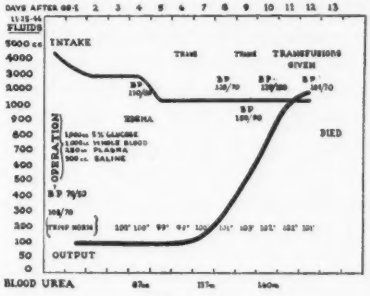

Fig. 1

were asked to see her, and at this time there was some evidence of generalized edema. We advised limitation of the fluid intake to 1,500 c.c. daily intravenously of 1.75 per cent sodium bicarbonate solution alternately with lactate Ringer's solution and sodium bicarbonate by mouth. On the seventh postoperative day the urinary output was 150 c.c. It gradually increased to 1,250 c.c. on the eleventh postoperative day and 1,925 c.c. on the twelfth postoperative day. During this time the patient also received several transfusions, in spite of which the erythrocyte count always remained under 3,000,000 and the hemoglobin around 50 per cent. The blood pressure gradually rose so that

on the tenth postoperative day it was 170/100, and in spite of the gradually increasing urinary output the blood urea on the tenth postoperative day was 160 mg. per cent. She failed rapidly and died on the thirteenth postoperative day. The pathologic diagnosis was "hemoglobinuric nephrosis due to a transfusion reaction."

Figure 1 (Case 1) shows graphically the course of the illness. For the short time the output exceeded the intake, it was not deemed advisable to increase the intake. The gradually increasing blood pressure in these cases is considered a poor prognostic sign.

As previously stated, this case presented a problem in that several factors had to be considered: surgical shock, blood loss, and the possibility of a transfusion reaction from the blood which the patient received during the course of the operation. The giving of whole blood during operative procedures increases the hazards of transfusion reaction.

In the vast majority of cases the reactions following transfusions are recognized by such symptoms as backache, chest pain, a chill, nervousness, and restlessness. They are usually recognized during the administration of the first 100 c.c. of blood. Many serious reactions have probably been prevented by careful attention to the giving of the first portion of the blood. When a patient is under anesthesia, these symptoms cannot be observed.

In many instances of anuria due to transfusion reaction, crush syndrome, burns, sulfonamide reactions, etc., it has been noted that beginning about the eighth to the tenth day the urinary output may rapidly increase in amount. At the same time the nitrogenous end products continue to increase in the blood stream, denoting inability of the kidneys to excrete these products. Due to this sudden increase in urinary output the physician may be led to give a false impression of the prognosis in the case, and frequently this increase of urinary output is attributed to some particular type of therapy, thus giving a false impression of the efficacy of certain procedures in the treatment of these cases.

In approximately 50 per cent of these cases when this diuresis occurs, recovery will follow without additional specific treatment. In the other 50 per cent death frequently occurs as a result of overtreatment. It is imperative in this stage that a proper water balance be maintained to prevent dehydration and a proper electrolyte balance. The urinary losses of sodium and potassium must be replaced. Ringer's solution intravenously should be employed. In some cases the use of Ringer's solution intravenously may be supplemented by the oral administration of salt solution and sodium bicarbonate solution by mouth.

Moon discussed the subject of renal deficiency associated with shock and again emphasized the fact that oliguria or anuria occur regularly during the development of secondary shock and that deficiency of renal function becomes a prominent feature if a state of sublethal shock persists for a time. He listed a variety of conditions, both medical and surgical, which may result in shock, and discussed the pathologic changes in the kidneys, the chief changes being hyperemia, edema, parenchymatous degeneration ranging to necrosis of the tubular epithelium with desquamation of the lining, debris, and hyalin, granular, and sometimes pigmented casts in the lumen.

The following case would likewise fall in this same general group. In this instance there were several factors to be considered as the initiating cause of the anuria: traumatic shock, hemorrhage, surgical shock, and a transfusion reaction.

In our opinion, the traumatic shock and blood loss were the chief contributing factors.

CASE 2. T. P., a 57 year old woman who had been struck by a motor car, was admitted to the accident ward of the Methodist Hospital at 8 p.m., Oct. 23, 1947 in a state of severe shock. There were scalp lacerations with clinical signs of concussion, multiple contusions and lacerations of the torso, compound fractures of both tibias and both fibulas, and fractures of the right pubis and ischium. That there may have been contusions of one or both kidneys or some injury to the urinary tract was suggested by the presence of gross blood in the urine which persisted for 6 days.

She was given 2 units of plasma and 2 transfusions of 500 c.c. each of whole blood with 1,000 c.c. of normal saline solution. After 4 hours of treatment for the shock and control of hemorrhage, under nitrous oxide and ether anesthesia the right foot and leg, which had been severely mangled, were amputated at the junction of the middle and upper third of the tibia. The fractures of the left tibia were reduced with internal fixation byplates.

When admitted to her room, the pulse was 94, the blood pressure 100/54, and the rectal temperature 100° F. During her first 28 hours in the hospital the intake, including the whole blood, glucose solution, and plasma in saline, was over 3,000 c.c., and the total urinary output was 165 c.c. The hemoglobin was 71 per cent; the red blood cell count, 3,300,000; and the white blood cell count, 9,750.

During the second 24 hours, with an intake of approximately 3,000 c.c., the total output was 180 c.c. My associate and I saw her the evening of October 25. As previously stated, we believed that the blood loss and shock were the chief contributing factors producing the oliguria. We advised limitation of fluids to 1,500 or 2,000 c.c. daily, a sufficient quantity to maintain a normal fluid balance in the presence of a low grade febrile reaction. Sodium bicarbonate was given by mouth and in the intravenous fluids sufficiently to alkalinize the urine.

A Foley catheter was inserted. The urinary output increased and during the next 24 hours was 600 c.c. It gradually increased.

Figure 2 (Case 2) shows graphically the course of the illness. With the gradual increase of urinary output and the gradually increasing fever, the intake was increased accordingly.

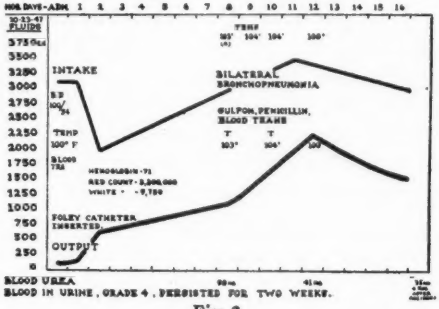

Fig. 2

On Feb. 24, 1948, four months following the accident, a catheterized urine specimen was normal chemically and microscopically. The blood urea was 35 mg. The phenosulfonphthalein output was 45 per cent in one hour. A dilution and concentration test was within normal limits; however, in five specimens 1.018 was the highest recorded specific gravity.

We feel that this patient has suffered minimal permanent damage to the kidneys up to the present time.

Another case of this same general type was seen recently. Death in this case was not due to renal failure but probably to several causes secondary to the shock. It does, however, illustrate clearly how rapidly failure of renal function occurs as a result of traumatic shock.

Case 3. H. O., an 83 year old man, was admitted to the accident ward at 8 p.m., Oct. 30, 1948. He had been struck by a motor car and was in severe shock. The chief findings were a dislocation of the left shoulder and comminuted fractures of the left tibia and fibula.

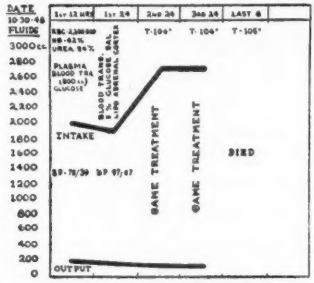

Fig. 3

The dislocation was reduced and a pillow splint applied to the left leg. The information was volunteered by the family that he was hypertensive;

however, there was no record available of his blood pressure during the preceding two years.

The blood pressure on admission was 96/40, the lowest recorded during the succeeding 8 hours was 64/36. During the first 12 hours the average was 78/39. The pulse averaged 104. A history of urinary difficulties was obtained and because of a suspected injury to the pelvis, catheterization was attempted. The house physician was unable to do so. Three hours following admission I was unable to catheterize him, and since he had a desire to void and could not do so, under local anesthesia and through a small skin incision a trocar was inserted into the bladder suprapubically and a catheter inserted into the bladder.

Figure 3 (Case 3) shows graphically the course. With the febrile reaction the intake was gradually increased.

It is fundamental in all these cases that fluids lost due to fever must be replaced. However, these patients do better with mild dehydration. Too much fluid, to compensate for the fever and in the presence of renal failure, adds to the gradually increasing edema.

The following case was difficult to evaluate as to the amount of fluids he required for a balance, whether the decrease in urinary output was due to renal drainage (lower nephron nephrosis) in his remaining kidney secondary to shock or possibly a transfusion reaction or to dehydration was a moot question. There was a sharp febrile reaction for 72 hours and the patient exhibited clinical symptoms and signs of dehydration.

CASE 4. C. K., a 39 year old man, was admitted to the accident ward of the Madison Methodist Hospital at 7:30 p.m. on Dec. 23, 1948. He was in severe shock, the temperature was 98° (rectal), the blood pressure 70/30 and the pulse 130. Around 12 noon he had been thrown from a manure spreader and he insisted a wheel had passed over his upper abdomen and lower chest. He had lain in the field approximately 4 hours and was thoroughly chilled.

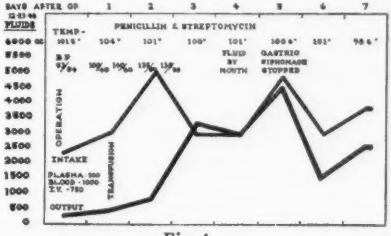

Fig. 4

Following the administration of plasma and saline solution, excretory urography demonstrated an injury to the left kidney, and injury to the spleen was suspected.

The abdomen was explored, which revealed a peritonitis with a plastic exudate, and there was an extensive hematoma of the posterior parietal peritoneum, a rent in the posterior peritoneum with free bleeding into the peri-

toneal cavity from the injured kidney, severe tears in the serosa of the stomach and a complete transverse rupture of the duodenum at the ligament of Trietz. An end-to-end anastomoses of the duodenum was done and the badly lacerated left kidney with a tear in a renal vein was removed.

Prior to the operation he received one unit of plasma with saline and during the operation 1,000 c.c. of whole blood followed by 1,000 c.c. of 5 per cent glucose in distilled water.

Figure 4 (Case 4) shows graphically the postoperative course. In this instance the clinical signs of dehydration indicated that more fluids than the usual 1,000 c.c. of glucose, plus the urinary output of the preceding day, was required.

Martineau and Hartman discussed the renal lesions in extensive cutaneous burns. The most important pathologic lesions in the kidneys following extensive burns in experimental animals and in humans, were found to be degenerative changes in the tubules, congestion of the capillaries and venules, tubular casts of the products of intravascular hemolysis, and lesions due to infection. *They point out most significantly, that while the renal lesions following extensive cutaneous burns are usually of a minor, secondary, and probably reversible character, with little danger to the patient, there are in a minority of cases more serious lesions caused by prolonged shock, by a combination of shock and intravascular hymolysis, or by infections, which may lead to renal insufficiency and death.*

It is important, therefore, that in the very early treatment of extensive cutaneous burns, every effort should be made to combat shock and to prevent the development of secondary infection.

Olson and Necheles, in a recent experimental study of anuria produced in dogs by severe burns, concluded that isotonic sodium sulfate solution given intravenously was a most effective agent in combating the anuria. Maitland, a British investigator, originally suggested the intravenous use of isotonic sodium sulfate solution in the treatment of the crush syndrome anuria.

Corcoran and Page discussed the crush syndrome or post-traumatic anuria. The writer has observed two instances, both in young men, caused by their being pinned beneath overturned tractors. In one instance, the accident occurred in the late fall and, in addition to his leg being crushed, the patient was subjected to a chilling temperature for several hours. This in itself is productive of shock. Death occurred in both instances with practically the same chain of events as occurred in the transfusion reaction case.

In their discussion Concoran and Page noted that there were two groups of renal changes: those in which the principal lesion was due to obstruction of the renal tubules by pigmented casts (myoglobin,

hemoglobin) and those in which the injury was caused principally by necrosis of the epithelium of the distal convoluted tubules. The underlying mechanism in all of these, and especially those associated with trauma to muscle tissue, is vasoconstrictive renal ischemia. The ischemia results in oliguria, which, associated with aciduria, predisposes to the precipitation of pigmented casts. The presence of myoglobinuria and hemoglobinuria under normal conditions is not seriously injurious to renal tissues, but in the presence of renal ischemia severe renal damage occurs.

For the preventive treatment of the crush syndrome and some phases of the allied states they recommend: (1) pressure bandaging of the injured area, (2) prompt treatment of shock by transfusion of whole blood or plasma, and (3) the intravenous injection of sodium lactate solution and the use of such diuretics as sucrose or mannitol in repeated doses of 5 to 19 mg. or of sodium sulfate, intravenously.

Alkalinization alone is not sufficient in the treatment of this condition and may in itself result in serious electrolyte imbalance.

Trueta and his co-workers suggest that the renal anoxia found in a number of pathologic conditions was probably "the result of overstimulation of the vascular nerves."

By a series of experiments, they have shown that, as a result of appropriate nerve stimulation, the blood may be diverted wholly or in part from the renal cortex and short-circuited through the medullary blood vessels (subcortical). They suggest that nerve stimulation could be produced centrally or peripherally by a variety of toxic agents and that the picture seen in some of these related conditions is the result of a defense mechanism by which the renal cortex is by-passed by the circulating toxin. However, too prolonged operation of the shunt results in permanent damage.

A clinical corollary of this work was the report by O'Sullivan and Spitzer of the successful treatment of 2 patients with acute renal failure in a series of such cases complicating abortion. They employed bilateral posterior splanchnic nerve block, according to the method of Kappis.

Anuria of sulfonamide origin poses a little different problem in that we have changes in the renal tubular epithelium similar to the changes in these other states, mechanical obstruction to the outflow of urine in the renal pelves and ureters, or occasionally, as I have seen in several instances in children, mechanical blockage of the urethra with masses of sulfonamide crystals. In this group of cases the urologist should be called early to do cystoscopic examinations.

This type of anuria can probably be more easily prevented than the others of this related group by seeing that any patient who is receiving sulfonamide therapy receives sufficient fluids to maintain a urinary output of more than 1,000 c.c. daily together with sufficient alkalies in some form to render the urine alkaline.

Innumerable instances of anuria following the use of the sulfonamide drugs have been reported in the literature, and in reviewing them, one is impressed with the number of cases which presented generalized edema as a major autopsy finding.

It is the opinion of many urologists that excessive amounts of fluids have been employed in the treatment of some of these cases. Thus, we have the rationale for the plan of treatment of limitation of fluids to an amount consistent with an adequate water balance and varying with the patient's temperature and of alkalinization to dissolve the particles of precipitated crystals.

In the two following cases this regimen was employed:

CASE 5. T. Mc., a man, aged 23, was admitted to the hospital on July 12, 1946 on account of nausea and occasional vomiting, generalized lumbar backache, and abdominal cramps. His urine, he had noted, was very dark colored and during the preceding 24 hours had gradually decreased in amount. He had been under treatment for a streptococcic sore throat and had received a debatable amount of sulfamerazine and penicillin. His temperature on admission was normal; however, for the following 48 hours it ranged from 99° to 100.4° F. The urine was acid, contained an occasional pus cell, and was packed with red blood cells and sulfonamide crystals.

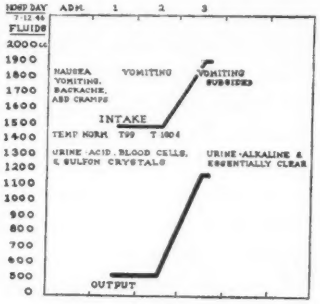

Fig. 5

In the absence of certain findings indicating an acute urinary tract infection secondary to the streptococcic pharyngitis and laryngitis, it was assumed that the condition was due to a sulfonamide reaction. In the absence of a febrile reaction his fluid intake during the first 14 hours of his hospital stay was limited to 1,000 c.c. of glucose solution in normal saline, in which he also received 3.25 Gm. of sodium bicarbonate. He was given an additional 500 c.c. of fluid by mouth, which contained 8 Gm. of sodium bicarbonate solution. The urinary output for this period was 525 c.c. (fig. 5, Case 5).

In this instance we were dealing with a rather marked case of oliguresis which would have probably gone on to anuria had the sulfamerazine been continued.

The following is a more severe case of oliguria progressing to an anuria of 24 hours' duration:

CASE 6. M. M., a 53 year old man, received a debatable amount of sulfadiazine because of a suspected facial erysipelas. He had taken the drug over a 4 day period when he developed generalized abdominal cramps, lumbar backache, nausea, and frequent episodes of vomiting. His urinary output had gradually decreased in amount, and he could not remember the last time nor the approximate quantity of voiding. He was afebrile on admission, on Jan. 30, 1946, and there was no clinical evidence of erysipelas.

A febrile reaction of 100° F. persisted for 48 hours following admission. The routine blood examinations were within normal limits. The urine was acid, containing blood cells and a few sulfonamide crystals. During the first 12 hours of his hospital stay he received 1,000 c.c. of glucose in normal saline containing 3.25 Gm. of sodium bicarbonate. During this same 12 hour period the total urinary output was 25 c.c. His blood urea on the second hospital day was 65 mg. The patient was catheterized on several occasions to rule out the possibility of urinary retention.

In the absence of sulfonamide crystals in any appreciable quantity, I did not think that we were dealing with an actual blockage of the ureters and renal pelves by crystals and elected to carry out the plan of limitation of the fluid intake sufficient to maintain a normal water balance, to provide for urinary excretion if the kidneys were doing so, together with alkalinization (fig. 6, Case 6).

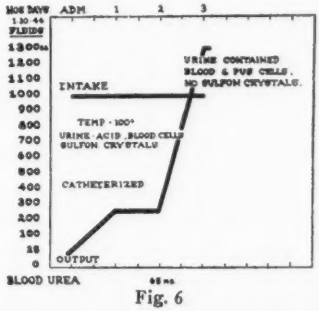

Fig. 6

At this point I would like to discuss generally the operation of renal decapsulation. In the treatment of all of these types of anuria a proper evaluation of the operation is extremely difficult. The operation has been employed in a wide variety of these allied states, yet a review of the literature will show that in the vast majority of instances it has been employed in the very last stages of the anuria. As previously pointed out, the renal changes which occur in these conditions are in many instances spontaneously reversible if the

patient's erythrocyte count and hemoglobin levels and water balance are maintained. Recovery is then ascribed to whatever special form of treatment may have been employed.

What part increased interstitial pressure in the kidney plays has been a debatable question. I am of the opinion that more recent studies would tend to show that tubulo-interstitial extravasation plays a more important part than was formerly thought, and thus the advisability of more commonly doing renal decapsulation.

Reuter, in a recent discussion of anuria in these types of cases, points out, as has been previously stated, that the renal damage is chiefly tubular in nature, that the glomeruli are not involved in the major lesion, and that if the urine, which continues to form from the glomerulus, is unable to escape through the tubules it will extravasate into the interstitial tissue of the kidney, thus setting up in turn another series of changes with injury to previously undamaged portions of the kidney. This could then produce the edematous swollen kidney sometimes seen at autopsy.

In my opinion, renal decapsulation should be more commonly employed in the treatment of anuria due to sulfonamides and in some instances where cystoscopy and ureteral catheterization reveal that there is mechanical blockage of the ureters and renal pelves by masses of sulfonamide crystals. In addition to decapsulation, pyelostomy or nephrostomy may be indicated.

Summary

In summary, then, it is to be noted that anuria occurs in a variety of conditions described as shock, the causes of which may be both medical and surgical.

Those following shock due to surgical operations, burns, sulfonamide reactions, the crush syndrome, and the ingestion of certain chemicals are probably the most common ones which we observe. In all of these allied conditions, the pathologic changes in the kidneys are similar. Treatment is both preventive and active and consists of the usual measures for the prevention of surgical shock and its treatment by the transfusion of whole blood and plasma and the maintenance of a proper water balance.

In the crush syndrome cases the crushed limb or limbs should have elastic bandages applied to prevent the escape of toxic products into the circulation and the loss of fluids into the tissues. Systemic alkalinization should be employed, but the patient's proper electrolyte balance should be maintained. Sufficient fluids should be given parenterally to maintain a proper fluid balance but should not over-

load the circulation and produce pulmonary edema which commonly is followed by bronchial pneumonia. One of the diuretic drugs may be given intravenously.

In those cases of anuria due to the sulfonamides, the limitation of fluids and alkalinization has been very effective.

Cystoscopic examinations and the proper measures applied for the relief of obstruction to the outflow of urine from precipitation of sulfonamide crystals should be done early.

In the average case of all these types where the patient is afebrile, an intake of 1,000 to 1,500 c.c. of 5 per cent glucose in water is sufficient, or 1,000 c.c. of 5 per cent glucose solution plus the amount of the urinary output for the preceding 24 hours.

When the stage of diuresis occurs the electrolyte balance should be carefully watched and the fluid intake should be increased to prevent dehydration. The replacement of the urinary losses of sodium and potassium is best accomplished by the use of Ringer's solution intravenously.

When the retention of nitrogenous waste products in the blood becomes a factor, continuous gastric lavage with a Wangensteen suction tube will aid greatly in the elimination of these toxic products.

And, finally, more thought should be given by the urologic surgeon to the operation of renal decapsulation and posterior splanchnic nerve block in the treatment of all of these types of allied cases.

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SPONDYLOLISTHESIS: A RARE VARIANT WITH A UNILATERAL ISTHMUS DEFECT AND SLIGHT DISPLACEMENT

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SPONDYLOLISTHESIS, a term coined by Killian[11] in 1853, is now recognized as a forward displacement of a vertebral body secondary to separation of the neural arch. The isthmic defect, involving that portion of a vertebra between the superior and inferior articular processes, is the basis for the separation. The vertebral body, pedicles, transverse processes, and superior articular processes, comprise one portion, and the inferior articular processes, dorsal portion of the laminae and the spinous process, comprise the other portion, that which is left behind when the so-called slipping occurs. Solution of continuity is bilateral in the true type of spondylolisthesis.

The variants of spondylolisthesis, which have received recognition, are few. Kleinberg and Burman[12] have described an anterior dislocation of the lower lumbar vertebra associated with a laminar defect. The unusual feature was displacement of the vertebra below the one with the defect. They believe these findings to be of traumatic origin. The mechanism is not clear to us and it is merely presented for what it is worth. Stewart[19] in the course of making detailed observations on the spines of the Eskimo and Pueblo Indians, was able to observe cases of spondylolisthesis without separation of the neural arch. Displacement occurred simply through arthritic erosion of the articular facets. To this condition Junghanns[10] has given the name "pseudospondylolisthesis." Reverse spondylolisthesis, a controversial subject, has received recognition by some observers, only to be condemned by others. It is a term applied to a condition where a vertebral body lies posterior to its adjacent vertebra below. When actually present, it is secondary to anomalous development of the articular facets in an abnormal plane. To the foregoing variants the authors wish to add another, namely, a case of forward displacement of the fifth lumbar vertebra secondary to a unilateral defect of the "isthmic zone" accompanied by a spina bifida occulta.

A review of the literature revealed only a solitary statement on

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the subject by Hodges, Phemister, and Brunschwig[9] as follows: "In those cases in which unilateral arch defect plus spina bifida allows unilateral slip with resulting rotation of the lumbar column, roentgen-diagnosis is difficult." Several authors (Garland and Thomas,[6] Meyerding,[15] Willis[20] and others[5-7,13]) take cognizance of the fact, however, that spina bifida occulta is frequently associated with true spondylolisthesis. To the authors' knowledge, no case like the one we are describing has ever been reported.

Case Report

L. K., a 26 year old white medical officer, first noticed pain in the low back while swimming on July 17, 1947. Inadvertently, during a "water fight," he believes that he rotated the back conjunctly with a forceful flexion movement. Immediately pain of severe nature was manifest in the left lower back in the paravertebral region. A dull ache persisted in this region for 24 hours, followed by complete relief. There was no radiation of pain at the time of injury; however, one week later pain in the dorsolateral aspect of the left foot

Fig. 1. Anteroposterior view demonstrating spina bifida occulta of the fifth lumbar vertebra and the first sacral segment.

became apparent. It was soon learned by the patient that upon raising the legs to the 90° position and flexing the lumbosacral region, the pain immediately subsided. Pain in the posterolateral aspect of the left hip, occasionally accompanied by "tingling" in the lateral aspect of the leg, appeared following

prolonged ambulation. At no time was low back pain with or without radiation noticed on coughing or sneezing. Sitting for long periods was tiresome, but never uncomfortable. Change in posture had never been apparent. Progression and prominence of symptoms prompted the patient to request an orthopedic examination in mid August, 1947.

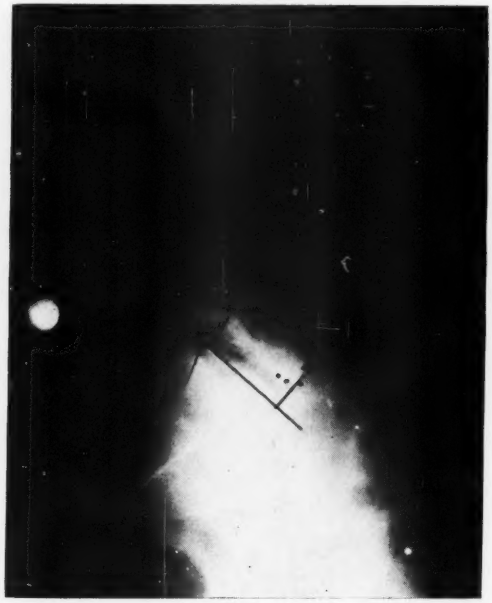

Fig. 2. Lateral roentgenogram demonstrating slight rotational displacement; the posterior inferior margin of the fifth lumbar vertebra and the posterior superior margin of the sacrum are outlined to stress displacement. Ullman's line passes behind the anterior inferior edge of the fifth lumbar body, a fairly reliable index of displacement.

Examination revealed increased muscular tonicity of the sacrospinalis groups. There was a tendency to accentuation of the lumbar lordosis, but no list of the spine was demonstrable. Lateral bending and rotation of the spine was free and painless. Pain was noticed on the extreme movement of flexion. Percussion of the lumbosacral region was painful and tenderness over both apophyseal joints, particularly the left, was elicited on palpation. Straight leg raising on the left was restricted because of pain in the back, but tenderness over the course of the sciatic nerve was not present. Sensory examination showed no evidence of hypesthesia or anesthesia and all reflexes were obtainable and equal. There was no variation in the level of the lumbar spinous processes.

The anteroposterior roentgenogram (fig. 1) showed spina bifida occulta of the fifth lumbar vertebra and first sacral segment. The lateral roentgenogram (fig. 2) revealed slight forward migration of the fifth vertebral body. This was regarded as a partial grade I displacement based on the classification of Meyerding. The oblique views were the key to the pathology at hand. On

the left (fig. 3), the defect of the isthmic zone was clearly visualized. A well defined, rounded, smooth solution of continuity of this region presented itself. There was sclerosis about the margins of the defect, but this was not a prom-

Fig. 3. Left oblique view showing gap in left isthmic zone. Defect outlined.

inent feature. The right oblique view (fig. 4) presented evidence of overriding of the articular surfaces of the apophyseal joint. The superior articular process of the first sacral segment was in the near proximity of the pedicle of the fifth lumbar vertebra. Likewise, the inferior articular process of the fifth lumbar vertebra approached the lamina of the sacrum. No narrowing of the apophyseal joint space was evident and sclerosis and erosion of the articular processes was absent.

Treatment consisted of conservative measures. Physiotherapy in the form of local heat and massage was initiated. This was supplemented by postural exercises and a Williams' flexion type of brace. Observation of the patient over a period of one month, however, revealed no relief of symptoms and no change in the examination findings. Therefore, the patient was hospitalized on Oct. 21, 1947 and placed on a firm bed with the trunk in a semi-flexed position. All symptoms subsided in one week. He was then able to do a light sedentary type of duty. To date, he has maintained a painless range of motion of the back, but some residual muscle spasm is noticeable. An occasional exacerbation of symptoms has occurred after prolonged walking or undue physical activity. Due to the patient's opposition to proposed surgical treatment, conservative treatment will be continued for some time.

Discussion

A rare instance of unilateral defect of the "isthmic zone" or pars interarticularis associated with spina bifida occulta has been presented, the end result being a variant of true spondylolisthesis. The authors are mindful of the implications and wish to comment on the genesis, pathologic aspects, and diagnostic features of this case.

The etiology of the isthmic defect (previously miscalled "pedicle" or "laminar" defect) is still a matter of conjecture. Whether it is on a congenital basis or due to the more recent traumatic explanation—birth or postnatal traumata superimposed on inherent weakness of the isthmus[1,8] is uncertain. A congenital cause is most probably the predisposing factor. In the presence of the isthmic defect, trauma, as an exciting factor, may exert selective force on the aforementioned region. In the authors' case the finding of a well-defined, rounded, smooth, unilateral defect with sclerotic margins in the oblique view and without evidence of callus on a roentgenogram taken one month after injury points to the fact that the defect was undoubtedly present prior to injury. The association of spina bifida occulta with unilateral isthmic defect lends some support to the hypothesis of the congenital theory, and, incidentally, some observers have also postulated the unilateral defect to be evidence of congenital origin.

Before delving into pathologic considerations, it may be well to point out that unilateral isthmic defect occurs in about 25 per cent of cases of separate neural arch, according to Willis.[20] Garland and Thomas[6] refer to rotational displacement observed only once in the presence of unilateral arch defect, but state that, if additional oblique projections are made at different angles, unilateral cases will invariably be found to be bilateral. In explanation of the unusual pathology present in this case, it is apparent that the bifid neural arch provides additional loss of neural arch stability by virtue of solution of bony continuity and functional loss of the interspinous and supraspinous ligaments. The normal lumbosacral articulation remains, however, as a buttress to prevent slipping to any more than a moderate degree. The sequence of events to the above changes was then assumed to be subluxation of the opposite apophyseal joint. This finding is demonstrated in Figure 4, showing definite alteration of alignment of the inferior articular process of the fifth lumbar vertebra with the articular process of the first sacral segment. There appears to be impingement of the latter process on the pedicle of the fifth lumbar vertebra. Acknowledgment is made of the fact that in the absence of a narrowed intervertebral disc and erosion or sclerosis of the ends of the facets at the site of impingement, as emphasized by Scott,[17,18] this change should be classified as simple

overriding of the articular surfaces of the right apophyseal joint. The failure to elicit any specific symptomatology or physical signs referable to the right apophyseal joint also bears this out. The authors contend, however, that an alteration of alignment of the articular facets in the form of overriding or actual subluxation is commensurate with rotational displacement of a vertebral body, as seen in this case.

Fig. 4. Right oblique view demonstrating definite luxation of the apophyseal joint. The superior articular facet of the sacrum approaches and probably impinges on the pedicle of the fifth lumbar vertebra; whereas, the inferior articular facet of the fifth lumbar vertebra approaches the lamina of the sacrum.

Since the occurrence of protrusion of an intervertebral disc associated with spondylolisthesis has received increased recognition[15,16] careful consideration was given to the possibility of the co-existence of the two lesions in this case. Because the clinical picture in this case is not confused by sciatic pain and the physical findings are not suggestive of a protruded intervertebral disc, it is probable that the pain and paresthesias are the result of impingement of a nerve root. Even in the presence of increased intraspinal pressure, it would appear that the spina bifida occulta would serve as a decompressing factor.

Although there was a slight displacement clearly seen, to make a

diagnosis of true displacement, we felt obligated to investigate all necessary criteria thoroughly. First, Ullmann's line was utilized (fig. 2). This line is drawn perpendicular to a base line established on the upper surface of the first sacral segment and extends upward from the anterior border of the sacrum. In the case under discussion, this line was found to lie 2 mm. behind the anterior inferior margin of the fifth lumbar. Garland and Thomas[6] report that the anterior inferior margin of the displaced vertebral body always touches and lies in front of this line. They also cite several complexities which do not contraindicate its use in this case. These are: (1) a blunt profile or osteophyte of the anterior superior margin of the first sacral segment, (2) a sacrum of the extremely horizontal type or a markedly wedged last lumbar intervertebral disc, in which case the test line may be extremely deceptive, and (3) a fifth lumbar body with unusually flared lower margins. Measurement of length of the inferior margin of the fifth lumbar vertebra compared to that of the superior margin of the first sacral segment revealed no discrepancy and the appearance of the vertebral body was rectangular. These findings eliminate the possibility of a confusing platyspondyly or brachyspondyly. Meschan[13,14] has recently described a method of mensuration which seemed applicable to this case. By his standards the amount of displacement was slight and instability was apparent. The reader is referred to his excellent paper for more explicit information on mensuration of spondylolisthesis.

In conclusion, it would seem that the case which we have described meets all the criteria of a spondylolisthesis and represents a rare variant not previously reported.

SUMMARY

A unique and unusual case of unilateral isthmic defect accompanied by rotational spondylolisthesis of the fifth lumbar vertebra is presented. A spina bifida occulta was present also in this case.

The problem of geneses, the pathologic aspects, and diagnosis, involved in the case, are discussed in some detail.

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PRESENT STATUS OF THE SURGICAL TREATMENT OF CARCINOMA OF THE ESOPHAGUS

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TOREK[1] was the first surgeon to perform a successful resection of the thoracic portion of the esophagus for carcinoma. This operation was reported in 1913. Prior to 1913 and for a long time after that, notwithstanding Torek's case, little progress was made in surgery of the esophagus for malignancy.

Sweet[2] states that Wendel and Sauerbruck were among the first to perform transthoracic resections of the cardia of the stomach but their patients expired. Previously in 1895 Biondi had done this operation on dogs. Sauerbruck, according to Torek,[1] felt that operations for carcinoma of the esophagus should be undertaken only if the new growth is either high up near the neck or low down where an anastomosis with the stomach could be made but that growths in the midportion of the esophagus are not removable. It is interesting today to study his reasons for these conclusions. First, inaccessibility of that portion of the esophagus; second, injury to the pneumogastric nerves and third, leakage from the upper stump.

Torek[1] in his reported successful resection performed a preliminary gastrostomy and then dissected the esophagus from behind the aorta (the tumor was located just below the lower border of the transverse portion of the arch of the aorta) and all the way up to the neck. The tumor was removed and the cut upper end of the esophagus was brought out through an incision in the neck at the anterior border of the left sternocleidomastoid muscle and the lower end of the esophagus was inverted. A rubber tube was used for the patient to swallow food through.

Following Torek's original report there were numerous attempts to perform his operation and further improve on the procedure by construction of a tube, extrathoracically, from the upper cut end of the esophagus to the gastrostomy. The results with the Torek operation were so poor that surgery was not advised for carcinoma of the esophagus in many hospitals. Roentgen therapy offered these patients little or nothing. Adams and Phemister,[3] quoting Watson from the Memorial Hospital in 1936, report a series of 666 patients with carcinoma of the esophagus receiving deep x-ray therapy. The average length of life of the majority was only 4.8 months. These same authors state that up to 1938 only 30 additional cases of successful resection of the thoracic esophagus for carcinoma had been

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reported since Torek's original report in 1913. The reason for the pessimistic attitude in the past towards carcinoma of the esophagus is obvious.

The great advance in thoracic surgery within the past few years is due to the development of positive pressure anesthesia, technical advances in surgery and to a lesser degree the use of newer chemotherapeutic agents. To these contributing factors must be added the better understanding of pulmonary physiology. It is the present consensus that the Torek operation, which even when successful has many disadvantages, can be discarded except for relatively rare lesions that extend well above the aorta. It may well be that the Torek operation will even be discarded for these high lesions as Garlock[24] recently reported a resection of the thoracic esophagus for carcinoma located above the arch of the aorta with establishment of a cervical esophagogastrostomy. This patient expired but the author proved that this procedure is technically possible.

As a curative operation the original Torek is unsatisfactory because, as Sweet[2] has pointed out, the abdominal cavity is not entered thus leaving the subdiaphragmatic periesophageal nodes and nodes along the left gastric vessels. As a palliative procedure it is a constant bother to the patient because of the discharge of mucus and saliva from the esophageal stoma above and the constant care of the gastrostomy below.

An important milestone in the development of esophageal surgery was the report by Adams and Phemister[3] in 1938 of a successful resection of the lower end of the thoracic esophagus for carcinoma and the establishment of an esophagogastrostomy utilizing the fundus of the stomach for the anastomosis. Carter and McGrath[4] state that a similar case was reported by Voelcker in 1907 and 4 additional esophagogastrostomies were reported up to 1934. In this country as early as 1910 Janeway and Green[19] thought that transthoracic resection of the lower esophagus with end-to-end union was feasible. These authors performed this operation and were the first to do experimental end-to-end anastomosis of the esophagus to the stomach. Even though Adams and Phemister may have been preceded by others in the performance of this procedure the former must be given credit for stimulating interest regarding surgery of the lower esophagus and the cardia of the stomach.

Another great milestone in the development of surgery of the esophagus was Garlock's report in 1944 of the re-establishment of esophagogastric continuity following resection of the esophagus for carcinoma of the middle third of the esophagus. In this operation

the esophagus was drawn up from behind the aorta, the stomach pulled into the thorax and anastomosis established between the esophagus and stomach anterior to the arch of the aorta. In 1945 Sweet[6] reported 9 cases of carcinoma of the mid-esophagus in each of which resection of the esophagus and esophagogastrostomy was carried out. In 1946 Sweet[7] reported a series of 66 cases of carcinoma of the mid-thoracic esophagus of which 32 were resected with establishment of esophagogastrostomy. This author repeatedly stresses the poor end results in the Torek operation and states that the patient so treated may die of metastases before the operation is completed. Sweet[7] believes that the palliative results of a high esophagogastrostomy even if the patient lives only 6 months to a year is worthwhile as the patient is able to swallow normally during this time. Steele[27] in 1943 was the first to report a case of carcinoma of the esophagus in England with treatment by resection of the esophagus and establishment of esophagogastrostomy. This was done in two stages, performing a gastrostomy first and doing the transthoracic operation at a later date.

As a result of the tremendous advances made within the past 10 years the outlook is much more hopeful for patients with carcinoma of the esophagus. Earlier diagnosis with prompt surgical treatment will further improve the operability and curability rate among these patients.

Age and Incidence of Carcinoma of the Esophagus

Graham and Ballou, quoted by Adams and Phemister,[3] in a series of 107 cases of carcinoma of the esophagus reported 85 per cent over 50 years of age and 39 per cent more than 60 years of age. In Sweet's[7] group of 66 cases of carcinoma of the mid-esophagus over 50 per cent were 65 years of age or over. Phemister[8] reported 8 cases varying from 46 to 64 years of age. Garlock[9] reported a series of cases of carcinoma of the esophagus operated and of the 29 operative deaths the average age was 61 years.

R. Adams[10] states that carcinoma of the esophagus ranks fourth in frequency among malignant tumors in males beyond the age of 20 years and accounts for 8 per cent of the deaths from malignancy beyond the same age. Garlock,[11] quoting Watson, says that carcinoma of the esophagus in New York City accounts for 3.5 per cent of all deaths from cancer. Taylor[12] reports from Great Britain that the statistics of the Registrar-General included 1,703 male and 716 female deaths from carcinoma of the esophagus in 1937. From these figures it is apparent that carcinoma of the esophagus is far more common than one usually suspects.

Foot[13] says that carcinoma occurs at one of the points of normal constriction of the organ: the level of the cricoid cartilage, the bifurcation of the trachea and the foramen in the diaphragm. Men are affected in 75 per cent of the cases. Three types of carcinoma may be recognized: flat and ulcerating, large and fungating, and infiltrating.

True esophageal carcinoma is epidermoid in character, exhibits cornification and formation of pearls and is derived from the epidermoid mucosa of the esophagus. Adenocarcinoma of the esophagus is usually an infiltration upward from the cardia of the stomach or it may arise, as suggested by Sweet,[2] from a tongue of gastric mucosa or aberrant gastric mucosa in the lower esophagus. Because of the continuity of the esophagus and the cardia of the stomach, malignancies of the two must be considered together as the lower esophagus and cardia form one surgical region as pointed out by Janeway and Green[19] in 1910. Nagel and Menke[20] state that 85 per cent of malignancy of the esophagus occurs in the middle and lower thirds of the organ.

Sweet[2] believes there is a tendency for carcinoma of the esophagus to invade lymph nodes early. The lymphatic spread is mostly downward to the nodes around the hilum of the lung, the ring of nodes around the lower thoracic esophagus, the nodes around the abdominal esophagus and cardia just below the diaphragm and those around the left gastric vessels.

Higher lesions extend directly into the aorta or the bronchus and in the upper third of the esophagus may involve the recurrent laryngeal nerve and supraclavicular glands. Foot,[13] quoting Ewing, stresses an important feature of esophageal carcinoma: its tendency to metastasize to the cervical nodes while the primary tumor is so small as to give no symptoms.

Humphreys[14] believes that malignant neoplasms of the esophagus and cardiac end of the stomach are often histologically well differentiated and tend to remain localized for long periods before metastases occur. Sweet[2] and Kinsella,[15] on the other hand, state that the rich lymphatic supply of the esophagus favors early metastases. Dorsey[16] believes squamous cell carcinoma of the esophagus tends to remain a local process in 25 to 40 per cent of patients affected. In Dorsey's experience carcinoma of the esophagus from the level of the bifurcation of the trachea downwards metastasizes to the lymph glands in the gastrohepatic ligament and do so before they involve the adjacent glands through the spread of malignant disease.

Clagett[17] reports 33 per cent to 50 per cent of all carcinoma of

the esophagus occurs in the lower third of the esophagus and points out that the lymphatic drainage of the lower third of the organ is much the same as that of the cardia.

Symptoms and Signs

Dysphagia is the most prominent symptom although Taylor[12] believes this to be a late symptom. He states one should be on the lookout for aching or burning in the chest or throat followed by, or with a tendency to, regurgitation of meals. These patients are usually elderly and as a rule do not present themselves for examination until dysphagia is marked. Pain is a late symptom. Lesions involving the upper esophagus may invade the left recurrent laryngeal nerve and cause hoarseness. Involvement of the phrenic nerve may cause hiccough or paralysis of the diaphragm.

Weight loss is the outstanding sign and is often to a marked degree. The amount of weight loss and the duration of dysphagia is no index of operability as pointed out by almost all writers on this subject. Tumors in the middle third of the esophagus as a rule become inoperable at an early stage because of fixation to and invasion of the aorta or left main bronchus. In the author's experience the occasional well nourished patient with a history of short duration of dysphagia may have invasion of the aorta by a tumor arising in the middle third of the esophagus and an occasional emaciated elderly patient may have a small tumor confined to the esophagus in the lower third of the organ.

According to Garlock[21] dysphagia does not occur until gross involvement of the esophageal lumen takes place. Garlock[21] also mentions the seriousness of a persistent backache due to posterior fixation of the tumor, but states that this does not necessarily mean inoperability.

Diagnosis

Carcinoma of the esophagus must be differentiated from cardiospasm, esophageal diverticula, foreign body, extrinsic compression of the esophagus, inflammatory stricture, bronchiogenic carcinoma invading the esophagus, diaphragmatic hernia and benign ulcer of the lower esophagus.

Cardiospasm occurs in a younger age group and is more common in women whereas carcinoma of the esophagus is more common in males and in those past middle life. In the latter disease early cachexia is the rule whereas patients with cardiospasm exhibit little or no weight loss although at times in this condition the loss of weight may be considerable. Study of the esophagus with a barium

swallow under the fluoroscope by a competent radiologist and by means of the esophagoscope are the most important diagnostic methods at our disposal. Spasm of the lower esophagus exhibits a smooth dilatation above the point of narrowing whereas in carcinoma there is an irregularity that is usually unmistakable. Esophagoscopy should also be carried out in all of these cases.

At this point it is of interest to mention the fact that some students of the condition known as cardiospasm believe that the dilatation of the esophagus is not secondary to a spasm causing obstruction but is a condition somewhat similar to megacolon.

Patients suffering from esophageal diverticula usually give a history of dysphagia of several years' duration, and as a rule there is little or no cachexia. These individuals will bring up particles of food swallowed several hours or days previously. The roentgenologist can establish the diagnosis without difficulty in most of these cases.

Foreign body may at times be a cause of dysphagia. The history is important and the duration of dysphagia is usually of short duration. When a sharp object such as a pin or chicken bone becomes lodged in the esophagus and perforates the wall of the organ mediastinitis may rapidly ensue with all the signs and symptoms of a severe infective process. The use of the x-ray and the esophagoscope will help establish the diagnosis.

Extrinsic compression of the esophagus may at times be a cause of dysphagia. Careful roentgenologic and esophagoscopic studies will rule out the presence of carcinoma of the esophagus. A recent case seen by the author was quite baffling to the roentgenologist and the esophagoscopist and although evidence pointed to a tumor of the upper esophagus the lesion turned out to be an intrathoracic extension of a carcinoma of the thyroid compressing and invading the esophagus.

Inflammatory stricture is usually diagnosed by the history of swallowing lye or other corrosive liquids.

Bronchiogenic carcinoma rarely may invade the esophagus and produce dysphagia and marked cachexia so that the signs and symptoms of esophageal disease outweigh the primary disease. In any patient complaining of dysphagia and weight loss with cough and hemoptysis or other signs and symptoms of pulmonary disease, bronchoscopy should be carried out in addition to the usual means of diagnosing esophageal disease. A bronchogram will also prove of value in such a situation.

A large diaphragmatic hernia may at times cause dysphagia.

These individuals as a rule are well nourished to obese in contrast to the early weight loss of patients with carcinoma of the esophagus. Roentgenologic studies of the esophagus and upper gastrointestinal tract will differentiate the two conditions.

Benign ulcer of the esophagus occurs most often in the lower esophagus and is probably in most cases ulceration of gastric mucosa that has extended upward into the esophagus. In this condition pain is an important and early symptom and overshadows the dysphagia as a rule. Fluoroscopic and esophagoscopic studies will usually establish the correct diagnosis. When there is any doubt as to the character of the ulcer biopsy should be done through the esophagoscope. In the event of a negative biopsy report the ulcer should be carefully followed until healing occurs and further biopsy studies done if healing does not take place.

Treatment

The treatment of carcinoma of the esophagus is surgical. The operative treatment is different for tumors located in the upper, mid portion and lower esophagus; therefore each will be discussed separately.

Carcinoma of the upper portion of the esophagus, that part of the esophagus between the upper border of the arch of the aorta and the root of the neck, is the least common site for carcinoma of that organ. Here the esophagus is in such close proximity to the recurrent laryngeal and vagus nerves, the trachea and left great vessels that most malignancies of the esophagus in this part are inoperable when first diagnosed.

The original or modification of the Torek is at present the best procedure for removal of cancer in this locality. A preliminary gastrostomy is performed and after a short period of time the esophagus is approached transthoracically, the lower end of the esophagus cut across and inverted and the organ dissected upward freeing it from behind the arch of the aorta and into the root of the neck. At this point great care should be taken not to injure the thoracic duct. If the duct is injured it should be ligated in order to prevent a collection of chyle in the pleural space. The tumor-containing part of the esophagus is then removed and the thoracic wound closed. An incision is made in the neck along the border of the left sternocleidomastoid muscle and the wound extended into the root of the neck. The cut upper end of the esophagus is then pulled up through the neck wound. A subcutaneous tunnel extending from the neck wound to a stab wound just below the clavicle on the left is then made and the cut upper end of the esophagus pulled

through this tunnel and brought out the stab wound. The neck wound is then closed.

The patient is able to swallow by placing a rubber tube in the open end of the esophagus and the lower end in the gastrostomy. A more satisfactory type of gastrostomy can be made using the lower cut end of the esophagus as the gastrostomy opening. This revision can be done following the more formidable procedure of removing the diseased esophagus. The lower end of the esophagus is dissected free from its diaphragmatic attachment and brought out through the upper abdominal wall. The muscle layer of the esophagus forms a good sphincter and helps eliminate the troublesome leakage encountered in the usual gastrostomy.

This type of gastrostomy is advocated by H. Adams[22] at the Lahey Clinic. Various technics have been described for construction of a subcutaneous tunnel from the upper cut end of the esophagus to the gastrostomy. Taylor[23] reported 3 cases in each of which the stomach was drawn up outside of the thorax and anastomosis between the esophagus and stomach carried out.

Garlock[24] recently reported a resection of the thoracic esophagus for carcinoma located above the arch of the aorta with cervical esophagogastrostomy. The stomach in this case was brought up to the root of the neck within the thoracic cavity and anastomosis carried out between the upper cut end of the esophagus and the stomach. This patient expired shortly after operation and at autopsy the cause of death could not be ascertained. This report indicates that technically esophagogastrostomy in carcinoma of the upper esophagus can be done and may prove to be the operation of choice rather than a Torek procedure.

In 1946, Reinhoff[25] reported a successful intrathoracic transplantation of the jejunum as a substitute for the esophagus with a lesion of the upper third of the esophagus.

In the treatment of carcinoma of the mid portion of the esophagus, that part behind or just below the arch of the aorta, the Torek operation was the procedure of choice until as late as 1944 when Garlock[5] performed the first re-establishment of esophagogastric continuity following resection of the esophagus for carcinoma of the middle third of the organ. Since Garlock's original report in 1944 numerous authors have reported the successful completion of similar operations for cancer in the mid esophagus.

In this operation, which is done entirely transthoracically, the seventh or eighth rib on the left is resected, the esophagus dissected up from behind the arch of the aorta, the tumor-bearing part of the esophagus excised and the esophagus anastomosed to the stomach

anterior to the arch of the aorta. The stomach is delivered into the left pleural space by incising the left leaf of the diaphragm after crushing the phrenic nerve, freeing the attachments of the stomach and esophagus to the diaphragm and cutting the vasa brevia and left gastric vessels.

In cutting the gastrohepatic omentum injury to the right gastroepiploic vessels should be avoided as the stomach will be dependent for its blood from the right gastric and right gastroepiploic vessels. Sweet[7] has pointed out the necessity of the maintenance of the integrity of the intercommunicating vessels within the walls of the stomach.

The upper part of the esophagus is dependent for its blood from the inferior thyroid artery; therefore, as Sweet[7] has stated, when the esophagus is pulled from behind the aorta destroying the small vessels from the aorta to the esophagus a long segment must not be left as necrosis will result.

In the presence of a carcinoma of the lower part of the esophagus various authors have advocated preliminary abdominal exploration. Although there are some who believe this preliminary step should be done in order to determine operability there are many, including the author, who believe this is an unnecessary step. The advances in anesthesia and in thoracic surgery have made the risk of exploratory thoracotomy so little that preliminary abdominal exploration should be eliminated.

More improved methods of preparing these patients for surgery have been responsible for the elimination of preliminary gastrostomy or jejunostomy. The type of operation for low lesions of the esophagus is a transthoracic procedure. The eighth rib on the left is resected, the phrenic nerve crushed, the left leaf of the diaphragm incised and the lower end of the esophagus with the contained tumor freed in its entire circumference. The stomach is then mobilized as mentioned above and cut across in an oblique manner so as to leave a tube-like structure along the greater curvature. The stomach is then pulled up and sutured to the esophagus at a point well above the tumor. The esophagus is cut across as the anastomosis is performed in order to prevent retraction of the organ.

Lewis[26] has mentioned some of the principles in doing esophagogastrostomy.

1. Adequate resection in bloc.
2. Removal of all tension from the suture line.
3. Avoidance of soiling.
4. An anastomosis that is two layered, precisely stitched with interrupted sutures.

5. Just as the sheet anchor in abdominal anastomosis is the serous coat so in the esophagus is the mucosa. This is thick and strong.
6. Water-sealed drainage and early expansion of the lung.

One of the most important technical points is to avoid the use of crushing clamps on the esophagus at the site of the anastomosis. Suture material should be fine and nonabsorbable.

Complications following resection of the esophagus are:

Mediastinitis due to leakage at the anastomosis, empyema and wound infection. Steele[27] mentions collapse of the lung, edema of the lung and stenosis of the anastomosis. Sweet[28] states that pulmonary embolus, peritonitis and acute parotitis are at times present as complications.

Summary

A review of the literature on carcinoma of the esophagus is presented and the present status of the surgical treatment of this condition evaluated.

Conclusion

As a result of advances within the past ten years in the treatment of carcinoma of the esophagus the outlook is much better for these patients. Earlier diagnosis with prompt surgical intervention should further improve the operability and curability of these cases.

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EMERGENCY THYROIDECTOMY

A Case of Intracapsular Hemorrhage in an Intrathoracic Goiter

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EMERGENCY thyroidectomy is a relatively rare surgical procedure necessitated by sudden compression of the trachea. Few reports have been made in medical literature of thyroidectomy as an emergency procedure. Fiessinger et al,[1] have reported emergency thyroidectomy to relieve tracheal compression caused by a "plunging goiter." Wendel[2] reported a case of fetal adenoma of the thyroid with spontaneous hemorrhage necessitating immediate surgery. In each case respiratory embarrassment was the only indication for surgical intervention. We are reporting a case history illustrating the danger of hemorrhage into an intrathoracic goiter and the necessity for emergency operation.

An enlarging intrathoracic goiter may cause a gradually increasing respiratory and cardiac embarrassment and differs in this respect from the dramatic picture produced by a sudden hemorrhage into a substernal gland. Numerous writers have indicated the common occurrence of intracapsular hemorrhage[3-7] into the thyroid and of intrathoracic goiter.[8,9] When these two conditions occur together a surgical emergency is the result. Several predisposing factors may be of importance. Schwoerer[6] in reporting gross hemorrhage into the thyroid in 18 cases out of 2,500 thyroidectomies states that hemorrhage occurs primarily in colloid and parenchymatous goiters. Wendel[2] makes the interesting observation that the statistics of large clinics relating to massive hemorrhage into the thyroid are speciously low both because these cases are extreme emergencies seen by the individual surgeon or general practitioner and because death may ensue so rapidly that a correct diagnosis is never made. Hemorrhage of a capillary nature is rarely noticed by the patient and is discovered, if at all, by the pathologist.[7] When the hemorrhage is massive, it may permeate the gland, rupturing and destroying it and leading to cyst formation.[6] This may produce sufficient pressure on the trachea to cause suffocation. Exertion,[7] trauma,[4,10] coughing,[10] or defecation,[2,7] may be the precipitating factor in producing hemorrhage.

Intrathoracic goiter has been reported as having an incidence of anywhere from 1 per cent to 30 per cent of all goiters depending on the writer reporting and on the geographical area from which the report is made. Hunt[8] reports an incidence of 7.8 per cent in 651

cases. Lahey[9] reports an incidence of 10 per cent in 13,000 cases.

Case Report

Mrs. M. K., a 52 year old white female, was admitted to the hospital on Aug. 22, 1946, in a state of collapse. She was gasping for breath, deeply cyanotic, and unable to talk. A satisfactorily complete history was impossible to obtain. Information given by her husband and the referring doctor was that the patient had had a goiter since adolescence. Ten years previously she had had a general anesthetic when she underwent a hysterectomy and at that time her doctor advised her to do nothing about her goiter. Three weeks prior to admission to the hospital she had first consulted her physician because of difficult breathing. He had told her that she had asthma. She received various medicaments for asthma but became progressively worse during the ensuing 3 weeks. Another doctor was called who recognized the cause of her dyspnea and referred her to our hospital, 65 miles away. She rode this distance in a car sitting upright and then walked up a flight of steps to the hospital admitting office. She was so extremely cyanotic and dyspneic that she was placed immediately in bed in a sitting position in an oxygen tent, which gave her little or no relief. Her greatest respiratory trouble was the difficulty

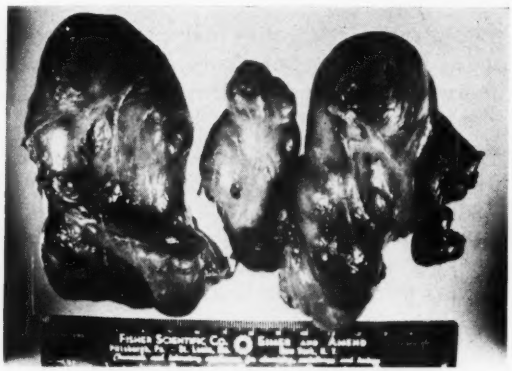

Fig. 1. Gross specimens of thyroid lobes.

of inspiration. She was apprehensive and perspiring profusely. Her pulse was 120 and thready. Respiratory rate was 40. A moderately firm mass was palpable on either side of the neck extended from above the thyroid cartilage down beneath the clavicle, obliterating the suprasternal fossa. This mass appeared to expand with each inspiration. Loud bubbling rales were heard in the left side of the chest posteriorly. These seemed to be entirely bronchial and there was nothing indicating asthma. Soon after admission her condition deteriorated, her pulse becoming weaker and more irregular and her cyanosis deepening. She was seen in consultation by a thoracic srgeon who inserted an intratracheal tube. With this her condition immediately improved and remained better until she removed the tube 2 hours later. She again became cyanotic and the respiratory and pulse rates rapidly increased until she suddenly stopped breathing. Artificial respiration was given until the intratracheal tube was reinserted. Once more her condition improved. It was felt that

removal of the tube again would result in death by suffocation and that immediate thyroidectomy would give her her best chance of survival.

The operation was performed under local and cyclopropane anesthesia, the latter administered through an intratracheal catheter. Both lateral lobes and the pyramidal lobe, which were very vascular and which extended well under the sternum, were easily delivered from this substernal position. The pyramidal lobe was largely responsible for the pressure on the trachea. It was wedged between the two lateral lobes on either side and the sternum anteriorly so that the only direction in which it could expand was toward the

Fig. 2. Cut specimens of thyroid gland showing areas of hemorrhage.

trachea. The pyramidal lobe and all of the lateral lobes except a small portion of tissue on the inner aspect of the posterior part of the thyroid capsule were removed. The thyroid groove was loosely packed with gauze on either side according to the Lahey technic and the wound closed using no other drains. During the operation the patient received glucose in saline, whole blood, and plasma. Total operating time was one hour and 25 minutes. The tracheal tube was removed and she left the operating room without respiratory embarrassment.

The pathologist reported an adenomatous goiter weighing 300 grams. Fresh hemorrhage had occurred in one lateral lobe and the pyramidal lobe. Areas of fibrosis and calcification were present throughout the tissue. The majority of the acini were large in size and distended with colloid but occasional small areas of hyperplasia were seen. Pathologic diagnosis was large adenomatous colloid goiter with intracapsular hemorrhage.

Following the operation the patient's respiratory rate dropped from 40 to 28; pulse rate, from 158 to 120. Six hours later she began to have a thyroid storm with a temperature elevation to 105° F., rectally. In spite of supportive treatment her condition gradually deteriorated during the next 36 hours until she expired.

Comment

A toxic intrathoracic goiter, complicated by intracapsular hemorrhage causing pressure on the trachea, necessitated emergency thy-

roidectomy which proved fatal to a 52 year old white woman. The operation relieved the extreme respiratory embarrassment but the patient succumbed because of the impossibility of giving adequate preoperative preparation.

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PRIMARY CARCINOMA OF THIRD PORTION OF DUODENUM*

Report of a Case

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PRIMARY carcinoma of the duodenum is a rare lesion, and particularly so in its third or infrapapillary portion. Most writers on the subject have referred to the rarity of the lesion, and many of them have cited interesting autopsy statistics to support this statement. Berger and Koppelman[1] reported 58 cases of primary carcinoma of the infrapapillary portion of the duodenum, and Shallow[2] late in 1944, reported that he had been able to collect from the world literature only 12 unquestionable cases of primary carcinoma of the third portion of the duodenum in which resection was done. He added one case bringing the total to 13. In the light of these facts we felt it would be interesting to add an additional case to the literature, and particularly so since radical resection was performed with survival of the patient.

CASE REPORT

History: A 64 year old white female was admitted to Welborn Memorial Baptist Hospital, Aug. 22, 1946, with a complaint of nausea and vomiting of 6 weeks' duration. Vomiting was frequent and severe at the onset, the vomitus being green in color. At the time of admission she vomited only on alternate days. There was no history of pain, chills or fever. Icterus was present at the onset, but the urine was straw colored, and the stools black at times. Malaise and weight loss were evident. Episodes of epigastric distress had been noted for 20 years. These attacks, on occasions, required morphine for relief, and one of them was followed by jaundice. She had not had an attack of abdominal pain for a year prior to admission.

Physical Examination: The patient appeared to be well developed and nourished and not chronically ill. Abnormal findings consisted of marked pyorrhea, a furrowed, red tongue and moderate epigastric tenderness about 3 cm. above the umbilicus. This area of tenderness was rather sharply defined and measured about 3 by 3 cm. in diameter. No abdominal mass or palpable viscera was evident.

Laboratory Findings: The urine was straw colored, clear, acid in reaction with a specific gravity of 1.021, albumin and sugar were absent, and the centrifuged sediment showed 12 to 16 pus cells and 0 to 2 hyaline casts to the high power field, and many epithelial cells. The red blood cell count was 4,530,000, white blood cells 8,600, and hemoglobin 13 Gm. The nonprotein nitrogen was 37 mg. per cent. The Mazzini was negative. The prothrombin time was 82.8

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per cent of normal; plasma protein 4.8 Gm. per 100 c.c.; and hematocrit 34.5 per cent.

Roentgenographic study of the gastrointestinal tract (by Dr. James S. Rich) revealed the stomach to be moderately dilated. The stomach filled normally, was freely movable and not tender. Peristaltic action of the stomach was vigorous. The duodenal cap filled nicely, it was dilated, but smoothly outlined and not tender. The first portion of the duodenum had a peculiar appearance. It had lost its normal markings and appeared somewhat narrowed and had a straight superior and inferior border. The first portion of the duodenum entered the second portion at a right angle. There was a linear area of decreased density here, the appearance of which suggested an adhesion. The second portion of the duodenum was definitely dilated, mottled in appearance, with flakes of barium visible here and there. Some normal markings were seen in this area. The third portion of the duodenum was not demonstrated at any time. Figure 1 is a reproduction of the roentgenogram dem-

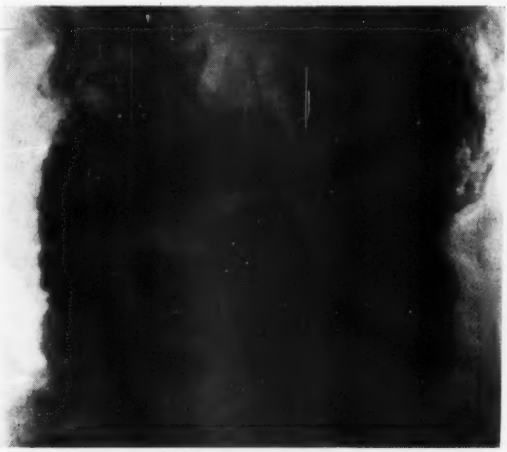

Fig. 1. Roentgenogram showing almost complete obstruction of the third portion of the duodenum. Note the peculiar configuration of the first portion of the duodenum, and the sharp angle at which it joins the descending portion.

onstrating some of these findings. A 6 hour film showed practically 100 per cent gastric retention. The 24 hour film showed almost 100 per cent gastric retention. The roentgenologist reported that these findings were highly suggestive of a malignancy either of the head of the pancreas or of the third portion of the duodenum. The radiologic diagnosis was obstructing lesion in the third portion of the duodenum, possibly a carcinoma of the head of the pancreas.

Operation: The patient was operated on Sept. 2, 1946, under cyclopropane, helium, oxygen, ether anesthesia administered by Dr. John H. Combs. A long, upper right rectus incision was used. Exploration showed the gallbladder to be slightly contracted, its wall edematous, subacutely inflamed, and filled with stones. The common duct seemed normal in size and was free of palpable stones. The liver was free of palpable nodules. The stomach was not enlarged, and no palpable abnormalities were noted in it or in the first portion of the

duodenum. The latter was kinked by a peritoneal band between it and the hepatoduodenal ligament. Palpation of the third portion of the duodenum in the region of the duodenojejunal juncture revealed a very firm, hard mass apparently ulcerating in type and apparently originating in either the first portion of the jejunum or the distal end of the duodenum. Figure 2 diagrammatically illustrates the location of the lesion. It seemed to be fairly mobile,

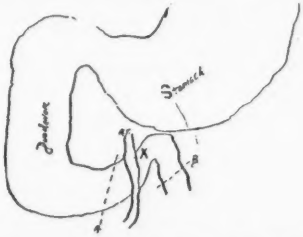

Fig. 2. Diagram to illustrate location of tumor designated by letter X. Lines A and B are sites of resection. The lines M.V. represent the location of the superior mesenteric vessels. Note dilatation of the proximal duodenum. Intestinal continuity was restored by end-to-end duodenojejunostomy.

and since there were no demonstrable intraperitoneal metastases, and only moderate fixation, an attempt at resection was elected. The operative procedure was begun by mobilizing the descending and third portions of the duodenum. The transverse colon was then delivered on to the abdominal wall and the peritoneum incised about the ligament of Trietz. The duodenum was then rolled towards the right, gently wiping it off of the inferior vena cava. The most difficult part of the dissection was about the uncinate process of the head of the pancreas. The growth seemed to have invaded the pancreas at this point, so a portion of the pancreas was resected along with the duodenum. The pancreatic defect was closed with interrupted mattress suture of fine silk. The superior mesenteric vessels had been identified, mobilized, and retracted towards the right. At this point, an indwelling Levine tube was passed through the pylorus and brought down near the duodenojejunal angle. The lesion was excised, and an open type of end-to-end, retrocolic, duodenojejunostomy, posterior to the superior mesenteric vessels, was fashioned. Clamps were not used. The jejunum was cut at a 45 degree angle which facilitated its approximation to the relatively larger, and slightly dilated duodenum. The papilla of Vater was not identified, but it was felt that the resection was distal to this point. The first layer of sutures in the serosa were of interrupted fine silk. A through and through stitch of 00 chromic catgut was then placed on the back side and brought forward as a Connell stitch. The anterior suture line was reinforced with interrupted sutures of fine silk. The peritoneum about the duodenojejunal juncture was closed with interrupted silk. Two Penrose drains were placed in this area and brought out through a stab wound in the left flank. The indwelling duodenal tube was passed about 2 inches distal to the site of anastomosis. Steel wire retention sutures were used to reinforce the abdominal wound. The patient was given 1,000 c.c. of citrated blood during the operation. The operating time was 4 hours and 45 minutes. The patient left the operating room in good condition.

Postoperative Course: The patient reacted well from the anesthetic. There was no shock. She was turning freely the evening of the day of operation. On

the second postoperative day there was a small amount of bile-stained drainage from the stab wound. After this, colorless, nonirritating fluid escaped for a few days. This was not examined for pancreatic ferments. A moderate amount of mucopurulent drainage persisted until the sixteenth postoperative day. On the third postoperative day, the Levine tube was found coiled up in the posterior nasal pharynx. Apparently it had been partially expelled by vomiting. A flat plate of the abdomen showed moderate dilatation of a loop of small bowel, probably representing the second portion of the duodenum. There was evidence of a small amount of gas in the region of the cecum and ascending colon. The radiographic impression was that of partial obstruction of the lower duodenum. A Miller-Abbott tube was passed, and allowed to come to rest in this region. The tube was removed on the ninth postoperative day, and the patient took food by mouth afterwards without difficulty. She left the hospital on the sixteenth postoperative day. At this time she was eating a low residue diet, was up and about, and her incision had healed by primary intention.

Pathologic Report by Dr. T. J. Moran

Gross Description: "The gross specimen consists of a portion of small intestine including the third portion of duodenum and the first portion of the jejunum. This portion of bowel measures 12 cm. in length and 5.5 cm. in circumference when opened. A firm tumor nodule measuring approximately 4 by 3 by 3 cm. is felt in the terminal portion of the duodenum. This nodule is annular and has encroached upon the lumen to such an extent that the tip of the finger cannot be admitted. The opening measures approximately .5 cm. in diameter. A scissor blade can still be inserted through the opening. A portion of pancreas measuring 4 by 2.5 by 1.5 cm. is intimately attached to the under surface of the duodenum. An extra strip of tissue from the normal portion of duodenum measures 2 cm. in length and 5 cm. in circumference. This tissue does not contain any tumor nodule. When the bowel is opened a large, ulcerative lesion is seen in the duodenum at the junction with the jejunum. The ulcer measures 2.5 by 1 cm. in surface outline and measures .8 cm. in depth. Its edge is raised, irregular, firm, nodular, and yellowish-gray. The cut surface of this area reveals a tumor nodule the surface of which is flat, smooth, firm, slightly granular, and yellowish-gray. The tumor extends irregularly into the superior surface of the pancreas but involves only the superficial portions. It is definitely of bowel origin."

Microscopic Description: "The section shows a malignant epithelial new growth derived from the duodenal mucosa. The tumor is made up of cuboidal or occasionally columnar cells arranged in irregular glandular fashion in a fine, scanty, fibrous tissue stroma. The glands vary greatly in size, shape, and staining quality. Generally speaking they are of average size and the cells are not particularly large. The nuclei are large, irregular, and unusually hyperchromatic. Atypical mitotic figures are rare. The glands are arranged in large sheets and irregular columns through the submucosa and muscularis and extend entirely through the bowel wall into the pancreas. They invade the included pancreatic tissue irregularly, but do not invade entirely through it. The pancreatic tissue itself appears normal. A small lymph node immediately behind the bowel serosa shows secondary tumor invasion. Several larger lymph nodes, which are not so intimately connected with the bowel wall, are not invaded. The bowel mucosa is markedly ulcerated and most of the mucosa in this area is entirely replaced by tumor. The ulcer base is made up of tumor

and muscle covered with a thick layer of fibrinous exudate containing numerous polymorphonuclear cells. A few Brunner's glands are seen in one section. The tumor is only moderately vascular.

"Diagnosis:

"Adenocarcinoma of duodenum (grade two).

Secondary invasion of pancreas and regional lymph nodes."

Figure 3 is a photograph of the surgical specimen.

Figure 4 shows photomicrographs of the lesion. For details see legend (fig. 4).

Fig. 3. Photograph of surgical specimen. Note the small ulcerated area on the duodenal mucosa.

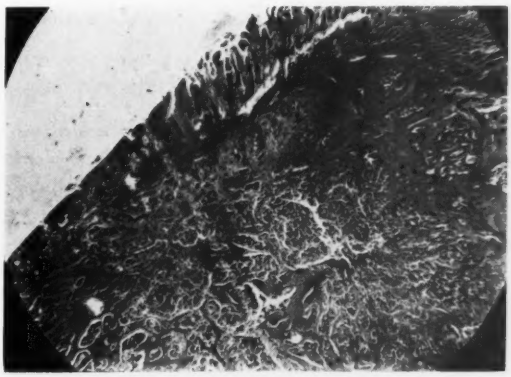

Fig. 4. Photomicrographs of the lesion. Section of duodenum showing the edge of the area of ulceration and invasion of the wall by the tumor. (Approx. 35x.)

Subsequent Course: The patient remained in good health for 12 months, then began to lose weight, pursuing a gradual downhill course, developed jaundice and a palpable liver and died 14 months postoperatively.

Comment

The preoperative diagnosis of obstruction of the third portion of the duodenum was established in this case, but its exact nature was not determined. It was felt by some that the distortion at the junction of the first and second portions of the duodenum might be due to a cholecystoduodenal fistula, and that the obstruction in the third portion of this organ was the result of an impacted gallstone. These conjectures were somewhat strengthened by a long history of biliary colic and jaundice, and the x-ray evidence of a pathologic gallbladder.

The resection of the duodenum was carried out without difficulty. Two problems were considered and discussed: First, whether the lesion was malignant, and second, if intestinal continuity could be readily restored. As to the first problem, some comments made by Hart in discussing Cohn's[3] paper should be considered. He reported the case of a man of advancing years, with a progressively

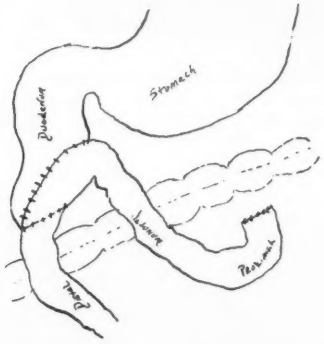

Fig. 5. Diagrammatic illustration of side-to-side antecolic duodenojejunostomy as reported by Shallow for restoration of intestinal continuity. For details see text. (Drawn from Shallow's illustration and description.)

increasing obstructive jaundice in whom roentgenograms of the barium-filled duodenum revealed a filling defect at a point interpreted as the ampulla of Vater. At operation, a mass measuring 1 by 1.5 by 2 cm. was felt in the duodenum in the region of the ampulla. The duodenum was opened; the lesion had the appearance of the ampulla of Vater with malignant change and an ulceration of 5 by 8 mm. in diameter. However, the ampulla was located about 1.5 cm. from this mass. The portion of the mass protruding into the duodenum was excised, and microscopic study revealed normal pancreas, with an ulcer overlying the point of maximal protrusion into the duodenum. The duodenum was closed. The patient

developed signs of liver insufficiency and died 4 days after operation. Such conditions, Hart points out, require that we keep in mind the possibility of benign lesions being confused with carcinoma with resultant extensive resection carrying a relatively high mortality rate.

The second point, that of restoring intestinal continuity, might require great ingenuity. It may be wise routinely to open the common duct and pass a probe into the duodenum in order definitely to identify the papilla. The decompressing effect of a "T" tube might be helpful in protecting nearby suture lines. The operation devised by Shallow,[2] and illustrated diagrammatically in Figure 5, seems to have many advantages over the one used here. These are listed by Shallow[2] as follows:

"1. The anastomosis is safer for it is performed where the duodenum has a peritoneal covering.

"2. The closed duodenal stump is reinforced by being buried in the undersurface of the distal jejunal loop.

"3. With the anastomosis side-to-side the angles can be well fortified and the size of the stoma regulated without encroaching on the common bile duct, ampulla of Vater, or the blood supply of the remaining duodenum.

"4. With the jejunum antecolic, obstruction from pressure by the superior mesenteric vessels and from the passage through the transverse mesocolon is avoided.

"5. A proximal jejunal loop is provided for a gastrojejunostomy should the duodenojejunostomy stoma be inadequate."

In our case, the patient partially regurgitated an inlying duodenal tube, probably as the result of vomiting. It would have been better if a Miller-Abbott tube originally had been passed, and the bulb inflated after it had passed the pyloric sphincter. This probably would have prevented regurgitation, and should have provided adequate decompression and consequent lessening of tension of the anastomotic suture line.

Summary and Conclusions

A case is reported of primary carcinoma of the third portion of the duodenum in which radical resection was performed with recovery of the patient. She remained well for 12 months, developed signs of metastases to the liver, and died at the end of 14 months.

It is suggested that opening of the common bile duct and passage of a probe to identify the papilla is advisable.

The Miller-Abbott tube offers a safer method of maintaining decompression, as its dilated rubber bag prevents regurgitation through the pyloric sphincter.

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COMMON DUCT CALCULUS SIMULATED BY AIR BUBBLE IN PANCREATIC DUCT*

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EVERY surgeon doing gallbladder surgery is repeatedly faced with the problem of residual calculi in the common duct even though he explores it carefully. Cholangiography before removing the T-tube usually demonstrates these stones which frequently may then be successfully treated by instillation of topical anesthetics and antispasmodics with irrigation through the tube.

Air bubbles in the bile duct can simulate calculi but this error may be avoided by withdrawing and reinjecting the contrast solution several times during the procedure and by the use of multiple films.

This case is being reported because an air bubble in the pancreatic duct was trapped in such a position that it perfectly simulated a common duct calculus and not until a second cholangiogram revealed complete filling of the pancreatic duct was the true situation realized. In this case the pancreatic duct makes a sharp loop behind the common duct and it was here that the air bubble was trapped, so close to the common duct that the oblique view did not separate them.

No record of any similar case can be found and the normal position of the pancreatic duct makes it unlikely to occur often.

CASE REPORT

Mrs. A. N. W., a 68 year old female, was admitted to Georgia Baptist Hospital complaining of pain for the past week in the right upper abdomen. On the day before admission this had suddenly become severe and cramping with radiation through to the back and beneath the right scapula. There was periodic nausea through the night with vomiting of dark brown, thick, foul-tasting material.

About 8 years previously she had begun having mild attacks of right upper quadrant pain and distress lasting several hours and occurring at about 6 to 8 month intervals. During the preceding 2 years these had become more frequent and severe, the last severe attack having been 4 months ago. There had been no hematemesis. Her appetite had been good but a bitter taste was constant. Fatty foods brought on the pains. For several days after each severe attack she described "dark, very foul-smelling stools." There had been no bloody or acholic stools. For the past 2 to 3 years she had had intense itching over the body, not associated with the abdominal episodes and relieved by

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medicine given by her physician. No history of jaundice or weight loss. She had had pneumonia 18 months before admission and has been told she has a "fallen bladder" which causes stress incontinence. Her blood pressure has been about 200/110 for several years.

Fig. 1. First cholangiogram with filling defect in common duct typical of small calculus. Explanation in Figure 2.

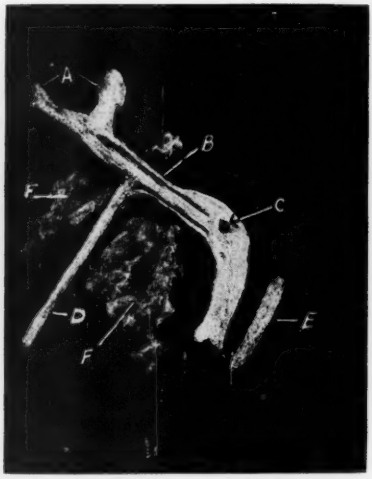

Fig. 2. Diagram of Figure 1. A. Hepatic ducts. B. Common bile duct containing short branch of T-tube. C. Negative shadow over common duct which persisted in different projections and after aspiration and reinjection of contrast solution, interpreted as cholesterin calculus. D. Long branch of T-tube. E. Partly filled pancreatic duct. F. Extravasation into gallbladder bed.

Physical examination revealed a well nourished elderly white female weighing 168 pounds. There was a right cataract. She was edentulous. Blood pressure was 154/90 in the right arm, temperature 100° F., pulse 82, respirations 25. There was moderate tenderness in the right upper abdomen. The abdomen was flaccid and no masses were palpable. The red blood count was normal. The white blood count was 14,050 with 85 per cent polymorphonuclear cells. The sedimentation rate was 35 mm. and icteric index 20. The urinalysis was normal except for a few white cells, occasional red cell and 1 plus albumin.

A cholecystogram using concentration method revealed an extremely faint gallbladder shadow with evidence of several cholesterin stones.

After 2 days on penicillin and intravenous fluids the temperature returned to normal and the white cell count was 9,050 and on the fourth day, 6,000.

A cholecystectomy was performed under spinal and sodium pentothal anesthesia on the fifth day. The common duct was opened and several small stones removed and a probe entered the duodenum with some resistance. Many small

stones were present in the gallbladder. A T-tube was inserted and 2 Penrose drains used. An appendectomy was also done. The postoperative course was uneventful except for slight rise of temperature following each of the cholangiograms.

Fig. 3. Second cholangiogram revealing that the shadow interpreted as calculus was actually an air bubble trapped in loop of pancreatic duct. Explanation in Figure 4.

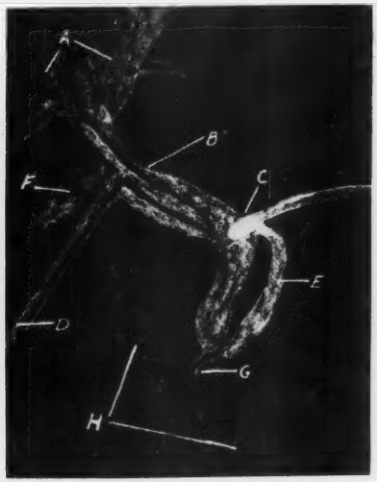

Fig. 4. Diagram of Figure 3. A. Hepatic ducts. B. Common bile duct containing short branch of T-tube. C. Loop of pancreatic duct behind common duct where air bubble was trapped. E. Pancreatic duct. F. Extravasation into gallbladder bed. G. Sphincter of Oddi. H. Contrast solution in the duodenum.

A cholangiogram (fig. 1) with 40 per cent diodrast on the tenth postoperative day revealed moderate dilatation of the common duct with very little contrast solution entering the duodenum. Some of the solution entered the terminal portion of the pancreatic duct. A 4 mm. filling defect in the common duct at the tip of the lower branch of the T-tube was interpreted as a calculus. This was persistent in all films before and after aspiration and reinjection done to rule out air bubble in the common duct. The T-tube was then clamped off for increasing periods without producing discomfort and on the fifteenth postoperative day a second cholangiogram (fig. 2) revealed complete filling of the pancreatic duct as well as the bile ducts. The pancreatic duct was completely visualized and made a loop behind the common duct at the exact point where the suspected stone was present in the first cholangiogram. It therefore proved that the apparent filling defect in the first cholangiogram was actually air trapped in the loop of the pancreatic duct ahead of the contrast solution which had entered it. Several views in different diameters supported this explanation.

The patient was discharged from the hospital on the seventeenth postoperative day. The tube was then clamped off without pain and was removed 14

days later. Healing followed promptly and the subsequent course has been uneventful.

Summary

A case is reported in which air trapped in the pancreatic duct simulated a common duct calculus in the cholangiogram.

INTUSSUSCEPTION DUE TO INVAGINATED MECKEL'S DIVERTICULUM IN ADULTS*

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THE strangulated types of intestinal obstruction result in the highest morbidity and mortality, probably because of misdiagnosis, prolonged use of decompression tubes, and delay in operation. One type of strangulated intestinal obstruction is ileo-ileal intussusception due to invaginated diverticulum.

In adults with symptoms and signs of intestinal obstruction, who have had no previous abdominal surgery, it behooves the surgeon to consider intussusception due to invaginated Meckel's diverticulum, and to operate early. The operation of choice is reduction of the intussusception, and disinvagination and amputation of the offending diverticulum. If the intussusception is irreducible, or if gangrene has supervened, then resection of the involved section of bowel is mandatory. Dennis recently reported 7 cases of intussusception in infants and children in which resection with primary, so-called aseptic, single layer, primary end-to-end anastomosis was performed without a single fatality.[6] At the Kennedy Hospital we employ the same technic with the exception that two rows of sutures are used in the anastomosis.

Meckel's diverticulum is present in about 2 per cent of the population.[4] About 1.5 per cent of all intussusception is due to Meckel's diverticulum.[5] In a collection of 201 cases of symptomatic Meckel's diverticulum from the literature, Miller and Wallace found 63 cases of intussusception. In their own group of 40 cases, they had one with intussusception.[2] Whereas hemorrhage is the most common manifestation of a symptomatic Meckel's diverticulum in children, it is less frequently seen in adults; obstruction, on the other hand, is not too uncommon in adults. Ochsner[1] classified the acute abdominal conditions caused by a free Meckel's diverticulum as follows: (1) intestinal obstruction, (2) diverticulitis, (3) ulceration, and (4) intussusception. In his excellent review of the literature, Harkins[3] in 1933 found that 17 per cent of the diverticula that cause symptoms, do so by producing intussusception. He collected

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160 cases of intussusception due to Meckel's diverticulum including 2 of his own, one in an infant and the other in a child of 5. In 111 of the cases, 60 were 10 years of age or under, 24 were 11 to 20 years of age, 7 were 31 to 40 years of age, and 5 were in the fourth decade. Males constituted 79 per cent of the total. The diverticulum formed the apex of the intussusceptum, invagination of the diverticulum being a primary factor in almost all cases.

In a series of 112 cases of intussusception due to Meckel's diverticulum reviewed by Harkins only 59 per cent recovered. The mortality was three times as high in those operated upon after 72 hours as in those operated upon during the first 12 hours.

Delay in surgery is usually due to the fact that the condition is not diagnosed early, most often being confused with appendiceal abscess, because of the nausea, vomiting and pain in the right lower quadrant. The classical history and course of appendicitis are not usually present. The pain is apt to be more colicky. Careful questioning will often reveal a history of previous small amounts of blood in the stool, as in one of the cases presented below. There may be fever, leukocytosis, slight to marked distention, and distended loops of small bowel with fluid levels on upright or lateral recumbent films of the abdomen. A mass may be felt, either in the right lower quadrant or by rectum as in the 2 cases reported herein.

Compared with other types of intussusception, several distinguishing features of the variety of intussusception due to Meckel's diverticulum, according to Harkins are:

(a) it occurs in older individuals,

(b) a history of previous attacks is more frequent,

(c) the course of the disease is more chronic and there is often a mild attack a day or two before the onset of the major illness,

(d) vomiting is more intense,

(e) if a mass is palpable at all, it is much more apt to be on the right side,

(f) a mass is present per rectum in a much smaller proportion of cases,

(g) bleeding from the rectum is more profuse.

Case Reports

Case 1. R. W., a 23 year old white male, was admitted to the hospital on May 18, 1947, with complaints of abdominal pain, nausea and vomiting beginning May 16. On that morning he suddenly began to have intermittent colicky pain in the lower abdomen followed by nausea and vomiting about 5 hours later. He was hospitalized at a local institution and on the following day, when his pain diminished, was discharged. He continued to have low

grade abdominal pain, nausea and vomiting. The last normal bowel movement he had was on the day of onset. He had had no previous similar attacks, nor did he ever have blood in his stools. His pain became localized to the right lower quadrant and he was admitted here shortly thereafter.

His temperature was 99° F., pulse 96, respirations 24, and he appeared moderately dehydrated. The abdomen was slightly distended with localized tenderness in the right lower quadrant and rebound tenderness in the same area. No masses were felt. Occasional peristaltic sounds could be heard upon auscultation of the abdomen. Rectal examination revealed marked tenderness and a questionable mass in the right pelvic fossa.

X-ray of the abdomen revealed moderately dilated loops of small bowel containing fluid levels (fig. 1). The leukocyte count was 6,250 with 59 per cent polys. Urinalysis showed 4 plus albumin, and numerous granular casts and leukocytes.

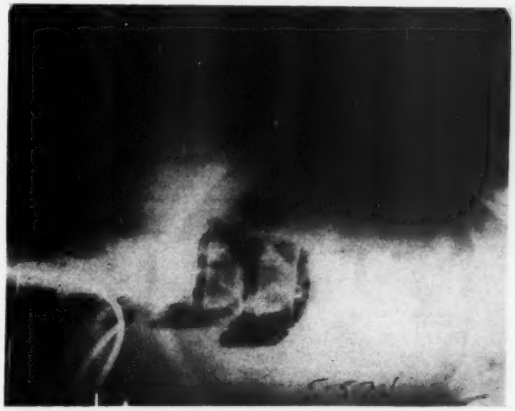

Fig. 1 (Case 1). Left lateral recumbent film of abdomen showing dilatation of small bowel with fluid levels.

The patient was given intravenous fluids, penicillin, and the stomach was decompressed by tube. Enemas resulted in the expulsion of small amounts of fecal material and flatus.

It was felt that he had a strangulated intestinal obstruction because of the signs of obstruction, the tenderness, the moderate temperature elevation and the mass by rectum, and laparotomy was performed 12 hours after admission. There was blood-stained fluid in the peritoneal cavity. At the distal portion of the ileum there was an irreducible gangrenous ileo-ileal intussusception which was resected and end-to-end ileo-ileostomy was performed. The specimen contained a gangrenous invaginated Meckel's diverticulum at the apex of the intussusceptum. This patient recovered and was discharged in good condition.

CASE 2. L. O. A., a 21 year old white male, was admitted to the hospital with colicky abdominal pain, nausea, vomiting and obstipation of 30 hours' duration. For one and one half years prior to admission this patient had been suffering with almost constant periumbilical pain associated with borborygmi

in the right lower quadrant. On various occasions this was accompanied by vomiting. From the onset he had had occasional tarry stools and lost about 20 pounds in weight, mostly due to fear of eating. In August, 1946, he developed severe acute aggravation of the above pain with nausea and vomiting. This persisted until he was relieved by passage of a stool after enemata. At about one o'clock in the morning of Jan. 16, 1947, he was awakened with periumbilical pain, recurring every five minutes, which was severe and colicky. One half hour later he vomited. The cramp-like pain, nausea, vomiting, and obstipation persisted until admission to this hospital 30 hours later. He had had one brother who had died of "appendicitis."

His temperature was 99.4° F., pulse 100, respirations 24, and blood pressure 120/80. He was a well developed young man who was apparently ill, and dehydrated. His tongue was coated and dry. The abdomen was slightly distended, tympanitic in the upper half and generally soft. There was slight generalized and rebound tenderness, slightly more marked in the left upper quadrant. Peristaltic activity with tinkling was heard, but no peristaltic waves were seen. No masses were felt abdominally. Rectal examination revealed a tender mass lying transversely high in the hollow of the sacrum, of firm consistency, suggestive of thickened bowel, but which felt to one observer like an abscess.

Fig. 2 (Case 2). Left lateral recumbent film of abdomen showing the fluid levels in the small bowel.

A lateral recumbent film of the abdomen showed dilated small loops of small bowel throughout with fluid levels in them (fig. 2). The urine was negative. Red blood cells 5,300,000; hemoglobin 16.1 Gm.; white blood cells 11,900 with 77 per cent polys. The blood N.P.N. was 38 mg. per cent; blood chlorides 441 mg. per cent; and the carbon dioxide combining power 59.8 volumes per cent.

Intravenous fluids were started, a Miller-Abbott tube was inserted for decompression, and he was taken to surgery. On opening the abdomen there was a fair amount of bloody fluid in the peritoneal cavity. In the distal portion of the ileum there was a gangrenous ileo-ileal intussusception. This was resected and end-to-end ileo-ileostomy performed. On inspection of the speci-

men it was found that a gangrenous invaginated Meckel's diverticulum formed the apex of the intussusceptum (fig. 3). The patient made an uneventful recovery.

Fig. 3 (Case 2). Photograph of opened surgical specimen showing the invaginated Meckel's diverticulum.

COMMENT

This condition resides in that group of acute intestinal obstruction in which the commoner causes are not self evident, i.e., no possibility of adhesions due to previous operation or of irreducible hernia. It is recognized easily, operated with promptness and with considerable success in children because it is suspected in patients of that age group. Above the age of puberty, however, it has not been diagnosed and treated promptly and, consequently, has been attended with extremely high mortality and morbidity rates. This is largely due to failure of suspicion of the cause of obstruction, which is the intussuscepted bowel bearing a Meckel's diverticulum, and the hesitancy on the part of physicians to diagnose acute intestinal obstruction unless an obvious cause of the obstructing agent is apparent.

About 80 cases of intussusception due to Meckel's diverticulum have been reported in patients above the age of puberty. The mortality rate in this age group is much too high and will not be lowered materially unless it, as a clinical entity, is on the mental list of surgeons who observe and treat these patients. Although the reported number of cases is not large, one suspects that there are many unreported cases and perhaps a not inconsiderable number of cases in which the obstructing agent was not definitely recognized.

Technically, it is a matter of common knowledge, since the advent

of sulfa drugs and the antibiotics, along with the favorable influence to mortality due to logical pre- and postoperative decompression, that resections of the strangulated bowel segment with a proper anastomosing operation can be accomplished with much lower mortality and morbidity rates. Therefore, the only remaining reason for a high mortality and morbidity rate can be definitely reflected in injudicious procrastination and fatal delay. False security in the obstructed patient due to betterment of condition from a few hours of decompression is known. The decision to deny the patient operation is a serious one, requiring astute clinical judgment and accuracy.

These 2 cases depict the possible danger. Both patients would have undoubtedly died if operation had been materially delayed or denied them. The diagnosis was certainly that of acute intestinal obstruction in young male adults without obvious cause (adhesions or herniae). These cases suggest that intussusception due to Meckel's diverticulum must be placed in the conditions second in frequency along with volvulus, internal herniae, neoplasms, and certain infections. Therefore, more urgency for early operation is suggested from its presence in this secondary group. These cases also demonstrate that operation must be employed regardless of the patient's improvement on decompression, particularly when the exact nature of the obstructing agent is not accurately defined. Finally, a survey of the literature, and observation of the courses, operations, and successful results in these 2 cases, suggest that operation is more imperative in the obstructed abdomen when the etiologic agent is unknown, as compared to the known one in which the surgeon can more accurately predict the role of strangulation.

It must be obvious that removal of the offending cause of the obstruction is in order. Without gangrene, early operation would entail simple reduction of the intussusception manually, and diverticulectomy, which would effect an immediate correction of the acute intestinal obstruction and at the same time prevent its recurrence permanently. If, as in these 2 cases, reduction cannot be accomplished because of gangrene or danger of serious contaminating tears of the bowel in the involved area, then resection and aseptic end-to-end anastomosis is a safe operative procedure.

SUMMARY

1. Two cases of ileo-ileal intussusception due to invaginated Meckel's diverticulum in adults are presented.

2. Intussusception due to invaginated Meckel's diverticulum is a variety of strangulated intestinal obstruction occurring in adults.

3. Early recognition and surgery of this condition will help de-

crease the morbidity and mortality from the group of strangulated intestinal obstructions.

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CANCER OF THE RECTUM: WHAT CONSTITUTES ADEQUATE RESECTION*

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THE cure of carcinoma of the rectum demands radical surgery. The prime objective of the operative procedure should be the complete eradication of the disease and not the restoration of bowel continuity. Many operative procedures have been devised for complete extirpation of carcinoma of this region. The choice of procedure often depends upon the acceptance or non-acceptance of a colostomy as a primary part of the operation.

Prior to 1908, most resections were carried out by the posterior route. At this time, Miles introduced the combined abdominoperineal resection for the removal of a large segment of bowel, regional lymph nodes, and perineal musculature. The soundness of the principles of this operation have been attested by such eminent surgeons as T. C. Jones, Pfiffer, Lahey, Abel, Coller and others. The 5 year nonrecurrence rate of 73.3 per cent reported by Miles in 1931,[1] and an array of other statistical data further proves the value of these principles. In 1938, Graham and Rankin[2] conducted a survey of English speaking surgeons and found that most had accepted the abdominal colostomy as a part of the operation for extirpation of cancer of the rectum and rectosigmoid.

The Basis for Anterior Resection

Before 1938, Babcock[3] was the only general surgeon of wide experience in large bowel surgery who consistently condemned any operative procedure which required a colostomy. At this time the results of the pathologic research on the lymphatics of the colon and rectum were published by Gilchrist and Davis.[4] The results of their work established the following facts:

(1) Sixty-nine per cent of all carcinomas of the rectum will have metastasized to the local nodes at the time of operation.

(2) Metastases may occur with little gross change in the nodes and can be demonstrated only by special pathologic methods.

(3) Retrograde spread occurs rarely (4.6 per cent of cases).

(4) Metastases occur in a cephalad direction and follow the course of the venous return. Retrograde spread occurs only when these lymphatic channels are completely occluded.

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*From the Myers Clinic Hospital.

*Delivered before the West Virginia Section Southeastern Surgical Congress, Huntington, West Virginia, on Sept. 4, 1948.

(5) Distant metastases may occur with lesions of any size. Small lesions may metastasize while larger lesions may not.

This work was further substantiated by Coller, Kay and McIntyre[5] in 1940. Since that time there has been a revival of "pull through operations," and a plea for preservation of sphincteric mechanism by surgeons with a personal aversion to colostomy.

The term "rectosigmoid" is confusing since it may mean a different location to various surgeons. To simplify this matter Gilchrist and Davis[6] suggest that tumors below the peritoneal reflection be called "extraperitoneal carcinomas of the rectum," while those above the peritoneal reflection and below the promontory of the sacrum be termed "intraperitoneal carcinomas of the rectum."

The Indications for Anterior Resection

(1) When the tumor lies at least 5 cm. above the peritoneal reflection.

(2) As a palliative operation in the presence of distant metastases—providing it can be done quickly and feasibly.

(3) In poor risk patients[7]—an anterior resection may be carried out and the rectal stump closed below the tumor.

(4) When colostomy is refused.

What are the Objections to the Anterior Resection with Restoration of Bowel Continuity?

(1) Surgical access to this region is difficult.

(2) Extraperitoneal segment of bowel lacks the visceral peritoneum which contributes to a dependable anastomosis, preventing leakage, and assuring healing.

(3) The perirectal structures are susceptible to infection.[8-10]

(4) The internal sphincter is often not preserved with consequent loss of continence.

(5) Local recurrence is of high incidence (15 per cent as reported by Daniels to Graham[11]).

(6) Troublesome strictures may form at the site of anastomosis.[7]

(7) More difficult and time-consuming than the classical Miles resection.

(8) An adequate segment of bowel cannot be removed.

In a revised analysis by Gilchrist and Davis in 1947,[6] they again stressed the need for the widest possible resection for lesions com-

pletely or partially below the peritoneal reflection, indicating that the procedure of choice was the Miles resection.

Recently, Graham[11] found that only 18 per cent of American surgeons undertake anterior resections routinely; 24 per cent never perform this operation; others indicated that it was used only in highly selected cases, or as a palliative operation. In answer to the question as to the operation of choice in the region of the rectosigmoid and rectum, 82 per cent indicated that the Miles resection was the procedure of choice. This change in surgical opinion has been brought about by the revised work of Gilchrist and Davis and the lack of 5 year non-recurrence rates comparable to those obtained by the Miles resection.

The following case reports emphasize the need for a radical operation:

CASE 1. A. S., a 66 year old white male, was admitted on July 2, 1941, complaining of increasing constipation of one year's duration requiring the use of increasing amounts of laxatives. There was also a "heavy feeling in the lower abdomen" and weight loss of 11 pounds. There was no pain or melena.

The abdominal examination revealed a small indirect inguinal hernia. The anorectal examination revealed one small external skin tag, prostate had a Grade I enlargement. Beyond the prostate there was a smooth non-tender firm mass. On straining and by bimanual examination the mass could be felt through the abdominal wall. It was about 6 cm. in diameter and freely movable. The remainder of the physical examination was non-revealing.

The clinical impression was carcinoma of the iliac colon. A barium enema was carried out revealing a tumor with irregular canalization affecting the lower sigmoid colon for a distance of 4 inches (fig. 1).

After preparation, a celiotomy was performed on July 11, revealing a large tumor mass in the iliac colon without evidence of local or distant metastases. The colon was mobilized and the tumor exteriorized by a Mickulicz procedure.

The hospital course was smooth, the patient being discharged with the colostomy closed on the 39th hospital day.

The pathologic specimen was examined by Dr. Everett L. Bishop, who reported an "adenocarcinoma, Grade II, the tumor being quite active but radio-resistant" (fig. 2).

The patient was followed in a routine manner and in 1943, a colon study revealed no evidence of disease. On Jan. 12, 1946, he returned complaining of soreness and itching around the former operative site with a small amount of purulent drainage. Examination revealed redness and induration around the operative scar with a small fistulous tract apparently entering the colon. Rectal examination revealed no tumor mass. The fistulous tract was explored and a tumor mass was identified in the distal loop of bowel. After preparation, a one stage combined abdominoperineal resection was performed on January 26. A portion of the anterior abdominal wall was likewise re-

moved. The hospital stay was uneventful with the patient being discharged on the 18th postoperative day.

Fig. 1. Barium enema showing tumor affecting the lower sigmoid colon.

Fig. 2. Tissue removed at first operation showing adenocarcinoma, Grade II (200x).

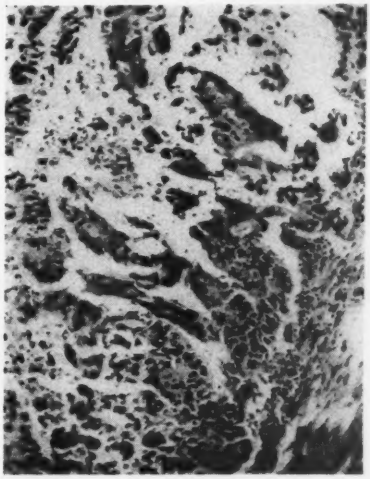

Fig. 3. Tissue removed at second operation showing adenocarcinoma, Grade III (200x).

The pathologic report by Dr. Everett L. Bishop revealed an "adenocarcinoma, Grade III, quite active, moderately radiosensitive, and with considerable necrosis" (fig. 3).

The patient has remained well since that time.

CASE 2. Mr. C. W. E. was admitted on April 8, 1948, complaining of "hemorrhoids" of 18 years' duration with rectal prolapse and bleeding. For one month, there had been lower abdominal cramping and semi-solid stools numbering 4 to 5 per day. During the past 2 months, the patient had lost about 6 pounds of weight.

The findings on physical examination were limited to the anorectal region. There were large internal and external hemorrhoids at the location of the primary hemorrhoidal veins with marked prolapse on straining. A questionable mass was palpable in the region of the sigmoid colon.

A cleansing enema was given and a sigmoidoscopic examination was performed. A bleeding polypoid mass was located near the 17 cm. mark. Several biopsies were taken and sent to the laboratory for examination. A diagnosis of "adenocarcinoma, Grade I" was made by Dr. S. D. Wu.

After preparation, a celiotomy was performed on April 14. The lesion was found to be at the level of the peritoneal reflection and measured 5 by 5 by 5 cm. There were no other palpable lesions in the rectum and no gross enlargement of the regional lymph nodes. However, since the lesion did not lie 5 cm. above the peritoneal reflection a combined one-stage abdominoperineal resection was performed.

The hospital course was complicated by a wound disruption on the 13th postoperative day. This was resutured and the patient was discharged on the 25th postoperative day.

Report of Pathology by Dr. Wu:

"Gross: The specimen consists of rectum and lower sigmoid measuring about 30 cm. There is a normal mucosal pattern from the sigmoidal end for a distance of 18 cm. At this level there is an ulcerative destructive growth measuring 4 by 3.5 cm. The lower margin is 16.5 cm. from the anal opening. The growth has destroyed the entire thickness of the wall and has reached the serosa. Four cm. below the lower margin of the lesion the mucosa shows

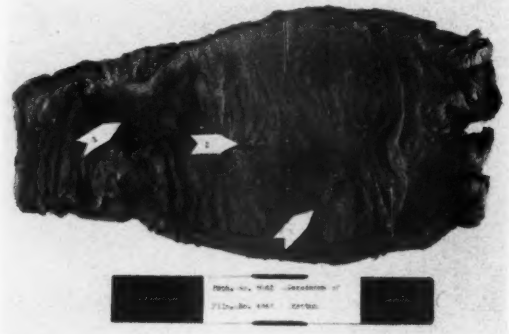

Fig. 4. Photograph of gross specimen showing 3 distinct lesions.

another polypoid growth with a broad base. This growth is soft and measures 2 cm. in transverse diameter and 1 cm. in height. About 3 cm. below this growth, there is another polypoid mass 4.5 by 3 by 8 cm. There are several

additional solitary polypi averaging 3 to 9 cm. in diameter. The upper portion of the specimen is free of these growths (fig. 4).

"Microscopic: Sections taken from the highest ulcerative lesion reveals a growth composed of many large and small glandular structures which have destroyed the mucosa and have invaded the muscular coat and in some places reaches the serosa. The cells composing these glands are hyperchromatic and differentiated well enough to show a columnar character (fig. 5).

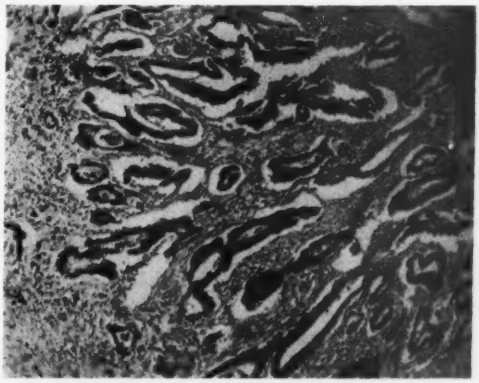

Fig. 5. Tissue of highest ulcerative lesion showing adenocarcinoma, Grade I (200x).

Fig. 6. Tissue from second lesion showing adenoma malignum (200x).

Fig. 7. Tissue from third lesion showing adenoma malignum (200x).

"Sections from the middle lesion show polypoid growth of the mucosa containing many large glands lined by deep columnar cells; however, in every place the glandular tissue along the deepest margin is limited by the muscu-

laris mucosa (adenoma malignum) (fig. 6). Section of the third lesion seems similar to above (fig. 7).

"Sections of all lymph nodes isolated from the mesocolonic tissue reveal lymphoid hyperplasia without metastases.

"Sections from the anal region revealed dilated veins.

"Diagnosis: (1) Ulcerative adenocarcinoma (of low Grade I) with local erosion.
(2) Polyposis of rectum (adenoma malignum).
(3) Absent metastases in regional lymph nodes.
(4) Internal hemorrhoids."

Discussion

Recurrences occur from tumor cells left at the time of operation. In Case 1, retrograde metastases did occur. The recurrence in some way became relatively more malignant as indicated by the grade of the tumor. There is a remote possibility that the tumor found at the second operation came from an adenoma and thus represented another primary growth. However, this is pure speculation. If the more radical combined abdominoperineal resection had been performed at the first operation, the second would have been unnecessary.

The second case shows that at the operation it is often impossible to determine accurately the extent of the gross lesion. In order to be on the safe side, it is our opinion that at least 5 cm. distal to the lesion should be resected to insure against retrograde spread. If a Miles resection had not been performed in this case, there would have been persistent foci for malignant degeneration. The small polypi were of a sessile type, commonly called "adenoma malignum" and would have soon become low grade adenocarcinoma.

Colostomy

Since a colostomy is an essential part of the operation for radical extirpation of rectal tumors, "intraperitoneal" or "extraperitoneal," a few words need to be said in its behalf.

We prefer the abdominal colostomy placed in the inguinal region to an uncontrollable perineal colostomy, placed in this region for sentimental reasons. Here the colostomy may be watched and cared for by its owner.

The unpopularity of colostomies is in a large measure due to its use in incurable cancer where the patient still has his disease and increasing pain. The second factor is the use of a colostomy bag with its distinct odor in spite of thorough cleaning. This is unnecessary since a pad usually suffices. If more protection is desired, a bag with disposable napkins may be used.[12]

Colostomies offer little trouble to grateful patients cured of their disease. With reasonable care and elimination of roughage from the diet the patient can carry on his business, social and athletic activities, without inconvenience or social stigmata.

In care of a colostomy, an enema is given once daily or every second day in a semi-reclining position and is expelled into a basin. This requires only about 30 minutes. A pad is then placed over the colostomy and held in place by an elastic band or girdle. When done in this manner the patient may go about his activities without fear of an accident.

There has been no regret in our patients with definitive surgery for having this procedure performed.

The proper adjustment of a patient to an abdominal anus depends on the surgeon bringing the full force of his personality in explaining that it is necessary to insure cure of the disease and longevity to the patient. The surgeon must believe in these tenets himself or he cannot convince the patient of its need. When properly explained most patients will accept the proposition.

Conclusions

(1) Retrograde metastases from carcinoma of the rectum do occur.

(2) It is often impossible to determine the extent of spread by gross examination.

(3) At least 5 cm. distal to the lesion should be resected for removal of retrograde spread.

(4) All lesions less than 5 cm. above the peritoneal reflection should be treated by the combined abdominoperineal method.

(5) The combined abdominoperineal resection of Miles is applicable to lesions of the rectum. It allows for wide removal proximally, the regional nodes, adjacent viscera if necessary, and perineal musculature.

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VASCULAR SPASM IN BATTLE INJURIES

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The purpose of this article is to report cases of vascular spasm encountered as part of the work of a general surgeon in a theater of war. A previous communication[1] emphasized that spasm is one form of reaction to injury, that injury not necessarily involving the blood vessel directly, and offered a tentative classification of a rather wide variety of conditions, gleaned from the literature, which had been known to produce spasm. This communication details a number of cases which may be filed under headings of that classification; namely, vascular spasm due to (1) direct injury (2) distant vascular injury (injury to one vessel with spasm in another), (3) injury to muscle tissue alone, (4) combined injuries of nerve, artery and bone, and of bone and muscle.

Several authors have pointed out that vascular spasm, due to varying causes, may be expressed as a constriction of a small segment, a regional spasm or a general spasm (although few cases have been reported in the latter group).

Case Reports

The skepticism of the British toward sympathetic blocks,[2-4] long established, and the growing distrust of our war surgeons[5-7]—based on disappointing experiences in connection with their attempts to relieve the spasm of collateral vessels—may popularize the application of arterial repair for cases such as this one, although that choice was not available to me as indicated in the case report.

Case 1. O. O., a Prisoner of War, 29 years old, had been injured 24 hours prior to admission by a rifle wound which had traversed his left thigh from back to front, fracturing the intercondylar portion of the left femur and producing a "blow out" in the upper portion of the left femoral triangle lateral to the artery (fig. 1). Examination showed a cadaverous left leg up to the level of the tibial tubercle, the usual signs of upper femoral fracture and no pulsation in the popliteal artery. After appropriate shock treatment, the patient was operated by first exposing the artery above the site of injury and applying a flexible intestinal forceps. The site of injury was then approached and a large quantity of clotted blood removed, thereby demonstrating that the profunda artery had been severed one inch from its origin and that the femoral itself, although intact, was contused and markedly contracted for a distance of just 2 inches, below the origin of the profunda, and contained a thrombus at this site. There was no pulsation in the artery distally. The clot was dislodged by manipulation and when the forceps above the site of injury was released (the profunda having been controlled by hemostat) the exposed portion of the femoral again transmitted blood and pulsated. A 45 cm. bronchoscopic aspirator (the best available instrument) was successfully introduced

into the stump of the profunda and passed distally to the bifurcation of the popliteal. Numerous small clots were removed from each of the divisions. The aspirator was withdrawn and the profunda ligated. After fifteen minutes

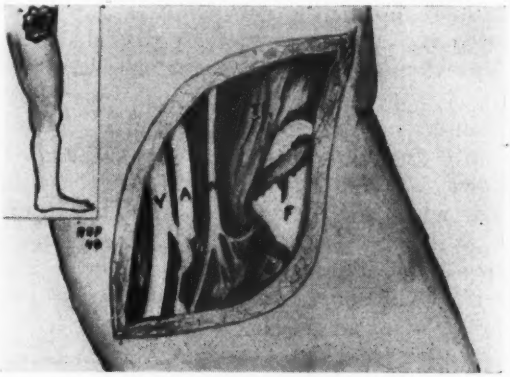

Fig. 1. Case 1. Depicting ischemia-producing spasm of a short segment of of the contused femoral Artery, and other regional damages to Femur, Nerve, Sartorius, Profunda femoris. (Pathology, drawn from memory, adapted to Sweet, in Callander.)

of observation, however, the femoral gradually contracted down to a state exactly as it was when originally seen, reformed its thrombus and ceased pulsating. A second attempt to dislodge the clot was unsuccessful. There being no heparin available, the tract of the missile was debrided and the patient put up in a spica cast. Amputation followed later.

Following are 3 cases of the most common variety encountered—namely, regional spasm complicating direct damage to the main stem artery.

Case 2. L. H., Infantryman, aged 24, had been wounded by a shell fragment which had perforated his left thigh in the upper femoral triangle region. His blood pressure on admission to the hospital was 80/40 but there was no pulse in either foot, although both feet were approximately equally warm. The patient was given 2 units of blood and when in a condition more appropriate for operation, it was demonstrated that the femoral artery had been completely transected and closed by thrombus near the middle of the femoral triangle. The profunda artery was intact but so spastic as to have a negligible pulsation. The wound was debrided; the femoral artery and vein ligated and periarterial stripping carried up to the inguinal ligament. (This was early in my battle experience; stripping was abandoned after several futile attempts.) The patient had a stormy postoperative course (temperature 103.5° F.), and pulses never returned to the ankle on the affected side. By the sixth postoperative day, the patient had a demarcating gangrene at the ankle.

Case 3. G. G., aged 21, was admitted with a history of having sustained multiple shell fragment injuries of the abdomen, both lower extremities and

face. The abdomen (4 jejunal perforations) received the priority attention and it was not until nearly 24 hours after admission, and 6 hours after the first operation, that the patient reacted from anesthesia. He complained of pain in the left leg at that time, and it was observed that the left foot was cooler than the right, and pulseless. He was returned to the operating room and the fascia of the leg opened liberally to demonstrate that the posterior tibial artery was transected very near its origin and that the peroneal was functionless, partly because of proximal propagation of the thrombus and partly because of spasm. The thrombus was removed, restoring temporarily the pulsation of the dorsalis pedis artery. Repeated lumbar sympathetic blocks of 1 per cent procaine were done in an attempt to save the extremity; however, the previously patent system soon ceased to function (3 to 4 hours) and a slowly progressing gangrene of the foot eventually required mid-calf amputation.

CASE 4. J. L. J., Infantryman, was struck in the left deltoid region, laterally, by a fragment of artillery shell 16 hours prior to operation. He had been given 1,000 c.c. of blood, oxygen and general supportive treatment in the shock ward. He came to the operating room with a cold left hand and forearm, functionless biceps, and wrist drop. This was all ascribable to a ragged opening, over the lateral surface of the deltoid region, 3 cm. in diameter. X-ray showed neither fracture nor foreign body in the shoulder region and the latter's absence was assumed to be explained by the fact that the enemy was known to be using a hardwood bullet in that sector at that time. (Subsequently, however, x-ray of the chest showed the metallic fragment, which caused the injury, to be in the posterior mediastinum.) Operative exposure of the first portion of the axillary artery was done for preventive hemostasis. On dissecting laterally, however, it was demonstrated that the first inch of the brachial had been transected and closed by thrombus. The artery and vein were ligated. Nerves were not identified because of the patient's poor reaction to anesthesia and elevation of the axillary artery, which latter produced considerable shock. Cervical sympathetic block of the stellate ganglion was done three times on a 12 hour schedule. When it was observed that this did not relieve the cold and useless hand, block was done to include the region of the 6th cervical nerve and the patient was grateful for immediate relief of pain, and there was moderate improvement in his circulation. Other measures included continuous oxygen for the first 4 days, withdrawal of which (en route to the operating room) brought from the patient agitated complaint of cramping. Also, repeated transfusions were performed until a hematocrit reading of 42 per cent was attained. The hand improved slowly until the sixth day, at which time there was good function, slight cyanosis at heart level and marked blanching on elevation. The patient had no pulmonary symptoms and no pleural fluid from the traverse of the foreign body through his chest.

The following case is suggestive of general spasm related to distal injury.

CASE 5. D. C. P., Infantry Captain, was struck by a fusillade of "burp gun" slugs (.25 caliber, low velocity, lead balls from machine pistol), 24 hours prior to admission. Examination showed severe shock, a pulseless right foot and a functionless and pulseless left arm. The patient also had multiple other wounds to contribute to his shock. He was treated with 2,500 c.c. of whole blood and other measures, and was suitable for operation after several hours. Exploration of the right popliteal space under tourniquet showed com-

plete interruptions of the artery and vein. These were ligated, a large hematoma evacuated and the area debrided. The first part of the axillary artery was then exposed for the purpose of preventive hemostasis and a tape passed beneath the vessel. Exposure of the third part of the axillary then showed a complete interruption of the vessel just distal to the origin of the subcapular artery. The point of interest in this case is that, notwithstanding a time interval of only a few thousandths of a second between the two injuries, the popliteal artery bled freely, whereas the axillary artery was discovered with only a few c.c. of blood in the neighborhood of interruption. Lumbar sympathetic block was done and the patient relapsed into shock, but responded to steep Trendelenburg position and an additional 1,000 c.c. of whole blood. The upper extremity was asymptomatic and useful on the seventh postoperative day; it blanched on elevation. The lower extremity rapidly went on to gangrene.

The axillary artery was not spastic at the time of operation but had it not been extremely spastic prior to the time of its injury and thereafter, there is no other way to account for its almost complete failure to bleed. If general syncope were used to explain its failure to bleed, then the same reasoning should be applicable to the popliteal. I believe the shock manifest at the time of examination must have been due to gradual blood loss from the multiple injuries.

The following are 2 cases of regional spasm due to muscle injury alone. Granting that all muscle is richly supplied with blood vessels, the above is not strictly a true statement. However, there is a little experimental evidence[8] to show that damage to end organs in the walls of blood vessels, even though mediating stimuli to produce local vascular spasm, are not so connected centrally as to propagate their spastic influences to larger vessels. There is also the clinical observation that in but few cases of damaged muscle was significant regional spasm produced. Cohen[9] is of the opinion that the spasm of vessels succeeding injury of closely neighboring muscle masses is due to "looping" of the vessel.

CASE 6. A. E., German Infantryman, had been injured by the passage of a small arms round through his left axilla from front to back. Shock was not marked and after 500 c.c. of blood the shock team considered the patient operable. On examination in the operating room, the patient had a cold, senseless and useless left hand and complained of severe pain in the forearm notwithstanding a previous injection of morphine sulfate, grs. ¼, which had been given one hour preoperatively. A shoulder cap field dressing was held in place partly by bandages which encircled the left arm just below the axillary fold. These bandages had been wet by rain and were tight enough to produce venous congestion which, however, was not observed. Under pentothal anesthesia, the dressings were removed, the area prepared and debrided and exploration was done. A complete dissection of the brachial plexus (in the neighborhood of the injury) revealed all nerves intact. The axillary artery and vein were also demonstrated to be intact. Up to this point, the arterial spasm had not been relieved. Ten c.c. of 1 per cent novocaine were injected into the region of the stellate ganglion and the radial pulse was soon palpable. This was repeated at 12 hour intervals for two more injections but even at the time

of the second injection, it was apparent that the arm had completely regained its vascular stability.

CASE 7. J. F. L., Infantry Private, aged 27, was admitted to the hospital with a perforating wound of the right thigh which had been caused by a large shell fragment 12 hours prior to admission. Immediately overlying the femoral artery in the lower portion of the femoral triangle was a ragged wound of entrance 3 cm. in diameter, and there was marked deep distention of the thigh, suggesting tension typical of interruption of a large vessel. In addition to these signs, the foot was cool in contrast to the unaffected side and careful examination elicited no pulse in the popliteal or smaller distal arteries. In view of these signs, the patient was prepared as if for operation on an artery, including a large cannula in an arm vein and whole blood available in quantity. He was anesthetized and a heavy tourniquet was applied through the groin utilizing 2 Kirschner wires as a substitute for the Wyeth pin. Complete dissection of the thigh showed numerous muscle arterial interruptions but examination of the femoral, profunda, and even obturator arteries showed no damage to these vessels. The tourniquet was removed, the wound was debrided and hemostasis attended. There was weak pulsation in the femoral (very spastic) but still no pulsation in the peripheral arteries. This patient was treated as if he had had major arterial interruption (with such facilities as were available), receiving repeated lumbar sympathetic block, whiskey, interdiction of tobacco, level leg and continuous oxygen for the first 3 days. After 24 hours, weak pulses returned to a normal appearing foot. On the fifth day, oscillometric readings were only slightly reduced on the affected side as compared with the well leg.

In cases of combined injury, the pathogenesis is even less clear, as in the following:

CASE 8. O. W., Infantry Sergeant, was operated on 12 hours after an injury consisting of a small caliber gunshot wound in the left arm. There was a small posterior and a larger anterior aperture through the lower third of the arm and obvious signs of fracture with displacement which, on x-ray, proved to be a combination of spiral and Y fracture into the elbow. Judging from the skin anesthesia and muscle paralysis, the patient was thought to have complete median and ulnar nerve palsies. He also had a cold pulseless hand and forearm, but did not complain of pain, as did the previous patient. Treatment consisted of debridement of the skin, a small part of the biceps, ligation of the brachial artery and vein, identification of the severed ends of the median nerve by coapting with a strand of black silk, and a cast. The ulnar nerve was found to be intact, however. After 8 hours, sensation returned over the ulnar distribution, the hand was warm and there was a questionable pulse in both radial and ulnar arteries which was corroborated by a more definite one on the following day. Due to the press of action and a very busy staff, the patient had only one sympathetic block (at the time of operation), whiskey and oxygen.

CASE 9. R. M., a German mortarman, was injured 24 hours prior to admission by a large shell fragment which had traversed his right thigh 3 inches above the knee, resulting in marked fragmentation of the femur and marked loss of the quadriceps tendon and rectus femoris muscle. He came to the operating room still in the field splint and traction. When this apparatus and his shoe were removed, a cold, pulseless foot and ankle and a blackened small

toe were revealed (fig. 2). Lateral x-ray showed the short distal fragment of the femur to be pulled back almost at right angles to the axis of the proximal fragment and it was assumed that this factor, combined with traction,

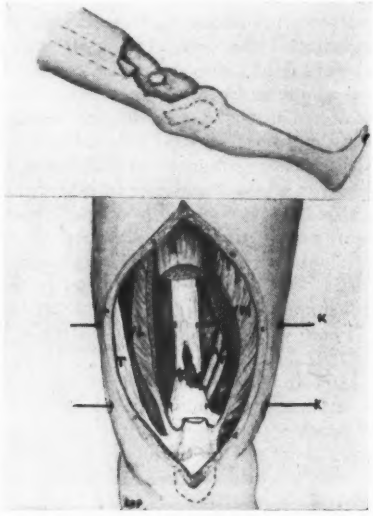

Fig. 2. Case 9. Depicts limited gangrene, due to ischemia of spasm only (note toe, in inset), due to compound fracture of femur and marked loss of elements of quadriceps, including all of the tendon of Rectus femoris, and portions of ilio-tibial Tract, Vastus Lateralis, Vastus Intermedius, Vastus Medialis. Artery and Vein apparently not injured, and vascular stability restored after debridement and application of Kirschner wires to femur. (Pathology, drawn from memory, adapted to Sweet, in Callander.)

produced enough stimulus to cause regional arterial spasm. At operation, the wound was necessarily debrided of so much skin and muscle that it was a simple job to introduce Kirschner wires through both fragments of the femur under direct vision. Subsequently these were incorporated in a plaster spica with heavy lateral splints, over which the wires were bent posteriorly to prevent their retraction through the cast. The circulation improved so well that, when seen at 24 hours, the leg and foot were warm except for the limited area of gangrene of the toe. It was assumed that the postural improvement in the short femoral fragment had prevented the progression of gangrene; however, when the patient was being made ready for evacuation on the sixth day, the wires were removed (in compliance with administrative order) and a new cast applied. The short fragment promptly dropped back into nearly its original position without any recurrence of the previous circulatory insufficiency. He was evacuated 24 hours after removal of the Kirschner wires; the foot was still warm and of good color.

In the treatment section of the previously mentioned review, several authors[5,6,10,11] are quoted as endorsing the prompt and complete restoration of blood volume as being a prime factor in the

lysis of vascular spasm and the consequent salvage of extremities. A case is presented to typify the difficulty of attaining the ideal restoration in cases where there is marked spasm in addition to direct injury of the main stem artery. This is not to say that complete restoration should not be strived for, but that under battle conditions, at least, it is frequently an impossibility (although blood may be available in quantity) because of the rapid rate of blood destruction which somehow goes on in an ischemic extremity. The proposition is brought up to emphasize that some form of arterial repair is necessary to save extremities damaged by modern missiles, especially when there has been obvious destruction of the collateral circulation.

CASE 10. W. F. S., Infantryman, was admitted to the hospital 12 hours following multiple injuries by mortar shell fragments, and was considered necessarily operable because of poor response to a 4 hour attempt to restore his circulation to a state more ideal for operation. The marked shock was thought to be due to both pain and blood loss as the patient was bleeding actively from a compound fracture of the right calcaneus which could not be staunched even with direct packing, and oozing from multiple wounds of both lower extremities, buttocks, both forearms—too numerous to count. There was deep tension of the left popliteal space defying palpation of the popliteal artery; there were no pulsations in the peripheral arteries of this extremity. Preoperatively, the patient received 2 units of plasma (1,000 c.c.) and a similar quantity of blood. Under ether anesthesia, the popliteal space was operated first in the hopes of saving the left leg. The patient's blood pressure fell from 105/60 to 80/40 after a brief period of operation—approximately 20 minutes. He received 2,500 c.c. of blood on the operating table and his final pressure was only 90/60. He was given 2,000 c.c. of whole blood within the next 24 hours and returned to the operating room for more treatment. The patient again reacted poorly to anesthesia and surgical trauma. He was given another 2 liters of whole blood during the second procedure and a similar quantity on each succeeding day, notwithstanding all of which his hematocrit fell progressively until the gangrenous leg was amputated on the fourth day. Following amputation the hematocrit began to recover on the same regimen, as follows:

		Hematocrit
Feb. 16	On admission	24%
16-17	1000 c.c. plasma, 6,500 c.c. blood in 36 hrs. Bleeding from heel.	
18		22%
19	No bleeding today. 2000 c.c. blood.	
20	Repeated 2000 c.c. blood.	
21	Amputated—2000 c.c. blood.	
22	2000 c.c. blood.	27%
23	2000 c.c. blood.	35%

Summary

Cases of battle injuries have been presented to show that vascular spasm—local, regional, and general—may be associated with injury to the vessel itself, another (distant) vessel, to muscles, and combinations of the above with nerve and bone injuries.

The difficulty of maintaining normal blood values (as judged by the hematocrit determination) in the presence of a gangrenous extremity, is illustrated.

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THE MANAGEMENT OF ACUTE INTESTINAL OBSTRUCTION

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FOR many years the old adage "never let the sun set on an intestinal obstruction"[1] was the basis of management. The passage of time without operative intervention to relieve the obstruction or to remove gangrenous bowel was attended by an increased mortality rate. We have come to realize, however, that the utilization of so-called conservative measures, judicially employed, may alleviate the obstruction or at least better prepare the patient for operation. We do not advocate that this period before surgery be prolonged unnecessarily with the hope and expectation that the obstruction may be overcome, but do insist that all preparation commensurate with rendering the patient in the best possible condition to undergo surgery be carried out. The duration of this period can be made to correspond with that time necessary to evaluate the patient's physical status, correct metabolic inbalances, and at least partially reduce distention.

Conservative management should not be indulged in for a period longer than the period of viability of the bowel distended above the site of obstruction once the patient has been adequately prepared. The period immediately preceding this critical point may last 6 hours and is that time during which the bowel is still demonstrating its inherent capability of function (motility and selective absorption), even though devoid of circulating blood. Blood circulation in the bowel wall is greatly embarrassed when the intraluminal pressure is equal to the diastolic blood pressure and ceases when the intraluminal pressure is equal to the systolic pressure. Distention is responsible for decreased circulation in the bowel wall, then, as well as occlusion of mesenteric vessels by constricting bands of hernial rings.

The level and character of the obstruction as well as the facility of the isolated loop and/or the proximal bowel segment to empty itself determines the rapidity of onset of the irreversible phase. Gangrene then being established diffusion of proteins and bacteria through the bowel wall and putrefaction in the bowel lumen with probable actual generation of gas occurs at an increased rate. Absence of muscular tone allows this to take place with further distention until perforation ensues when the intraluminal pressure is somewhat less than the 210 millimeters of mercury required for normal small intestine.[2]

The etiology of the intestinal obstruction has a great deal of bearing on what one can expect the clinical course to be. The most common etiology is postoperative adhesions and in these cases Hendricks and Griffin found that the terminal ileum was the site involved in 89.4 per cent of the cases. Next in greatest frequency is external hernia and then come the large bowel obstructions of which 90 per cent are due to carcinoma. Eighty-one per cent of these carcinomatous lesions being in the left half of the colon and 19 per cent in the right half of the colon.[3]

The mortality of small bowel obstruction is roughly 25 to 30 per cent, while those of the large bowel are 15 to 20 per cent in various series reported. Gangrene is present in approximately 10 per cent of small bowel obstructions and this along with the more rapid and repetitious vomiting with conconitant metabolic disturbances are evidently the causative factors for the higher mortality of small bowel obstructions. When gangrene is present necessitating resection of the bowel the mortality is more than doubled. It is, therefore, of prime importance to determine the site of obstruction and the degree of impairment of vascularity in the involved segment of bowel promptly.

The first step in the management of acute intestinal obstruction is like that for any other illness: a prompt and accurate diagnosis. It is, therefore, our custom that upon admittance of the patient a careful hour to hour history is taken in regard to the present illness and that a careful survey of all prior illnesses, operations and traumas is made. As we all know the diagnosis of intestinal obstruction is based upon a history of cramping abdominal pain, obstipation, nausea, vomiting and abdominal distention in the usual case. One should make an attempt to find out the time of the last spontaneous bowel action and what has been done since then to secure an evacuation of the colon. The passage of flatus or blood is also extremely important. Pain of intestinal obstruction is oftentimes gradual in onset and of a cramping nature which increases in frequency and intensity as the obstruction becomes more complete and then the pain becomes continuous with the progression of distention and increased impairment of the vascularity of the involved bowel. Vomiting which at first may consist only of food previously eaten or stomach secretions changes later to a stercoraceous nature as stagnation and putrefaction occur. Retroperistalsis and contamination of upper intestinal tract material by lower bowel bacteria is responsible for the putrefaction. The rapidity of onset of the vomiting and the frequency of its recurrence varies with the completeness and level of the obstruction.

A careful physical examination should be carried out preferably leaving the abdominal and unforgettable part until the last. The physical findings of distention, possible peristaltic wave patterns, masses, scars, particular type of peristaltic sounds, and evidences of a disordered metabolism such as dehydration, acidosis or alkalosis, relative anoxia, and varying degrees of shock can often be discerned. Distention is present when it is impossible to lay a straight edge from the xiphoid to the pubic prominence without touching a good deal of the anterior abdominal wall. The normal abdomen even in an obese person is scaphoid, that is, when a straight edge is placed on the xiphoid and pubic prominence the anterior abdominal wall subtends an arc beneath it. Further inspection or palpation will oftentimes reveal the presence of a bowel pattern in which peristaltic waves may be seen or a mass discerned. The presence of tenderness in the abdomen denotes the etiology of the obstruction to be an inflammatory mass or that perforation or serious interference with the circulation of the involved segment of bowel with its consequent diffusion of bacteria and peritoneal reaction has occurred. On ausculation of the abdomen one can often hear the typical borborygmic sounds coincident with the patient's pains. The intensity of the rushes and their pitch give one a clue to the degree of obstruction, its duration and its effect on the circulation of the bowel. Short high-pitched rushes at infrequent intervals with a few tinkles appear just before the abdomen becomes completely silent. Rectal examination and careful inspection of the usual external hernia sites including the area of abdominal scars may demonstrate the probable etiology and seriousness of the obstructing phenomenon.

The history and physical findings are corroborated by the use of certain laboratory tests which include the character of the gastric contents and colonic washings, the specific blood chemistry variations, routine blood and urine analyses, the flat plate of the abdomen (made if possible with the patient in an erect position) and the use of a contrast enema.

Aspiration of the stomach should be carried out as a measure for treatment and for diagnosis. From the diagnostic standpoint the presence of a foul-smelling brown liquid signifies that the obstruction is fairly complete, has been present for a considerable length of time and has undoubtedly seriously upset the metabolic balance of the body. It will obviously reduce distention and will make the patient much more comfortable as well as relieve the embarrassment of the physical dynamics in the chest.

If the patient is unable to accept a full 2 quart (normal adult colonic capacity) cleansing soapsuds enema one must conclude that

there is a probability of a colonic obstruction or that there is tremendous distention in the abdominal cavity. Failure to return the solution may be due to an intestinal atony due to peritonitis. The significance of blood, feces, flatus and worms is obvious.

Blood studies may show hemoconcentration, anemia, increase or decrease of the carbon dioxide combining power, and decrease of the chlorides with an increase of the nitrogenous retention products. Serum proteins will be lowered in most cases. Urinalysis will reveal the presence of complicating lesions as well as the seriousness of dehydration and acidosis or alkalosis and toxemia.

The interpretation of x-ray pictures requires considerable experience but from them one can often learn the site and type of obstruction. For instance, distention of the small intestine is obvious 4 hours after complete obstruction by taking a flat plate of the abdomen. However, the presence of gas in the small bowel of infants is not pathognomonic of obstruction for small amounts are normally present. One should first of all try to determine whether the large or small bowel or both are involved in the distention and this is made easier if one knows the difference in the pattern caused by the valvulae conniventes and haustra coli. The former cause no indentation in the margin of the bowel wall and extend across the entire lumen of the segments. Haustra coli on the other hand cause an indentation in the margin of the bowel and do not extend across the lumen. Volvulus may give a single isolated intestinal loop distention picture. Gallstones responsible for ileus may be radioopaque and appear at the abrupt termination of distended bowel. The presence of a diaphragmatic hernia should be easily discerned. Atresia of bowel lumen should be thought of in the very young infant with an obvious intestinal obstruction. Free air from perforation can best be found by fluoroscoping the patient when he is lying in a left lateral position using the vertical fluoroscope. If there is any doubt as to how much of the gas pattern is due to large bowel distention it is advisable carefully to administer a barium enema. One must never utilize barium by mouth because it is only with a great deal of difficulty and considerable passage of time that one can discern the site of obstruction and before he is able to accomplish this the barium will undoubtedly become so inspissated that it will cause further obstruction and complicate the recovery period. After a tube for intestinal decompression has been passed and the site of obstruction seemingly met with one can often to advantage x-ray after instilling a small amount of thorotrast for confirmation.

We all know that the illness of the patient as shown in his consequent history and findings will vary in intensity with the duration of

his symptoms, the level and completeness of obstruction and the degree of vascular damage in the involved segment of the bowel. While one is focusing his attention upon these factors he must not lose sight of the fact that he is after all treating the patient and a careful search with the disclosure of concomitant illnesses, such as diabetes, cardiovascular, pulmonary or genitourinary difficulties, may have a profound effect upon the outcome of this illness, just as they oftentimes have upon the etiology of the difficulty. The alert diagnostician and therapist will, of course, have constantly in mind various syndromes which will needfully be differentiated.

As soon as the history and physical examination have been performed a small dose of opiate is given to secure the patient's confidence and combat any impending shock. The urine and blood samples are then secured and the stomach is lavaged with a large tube in order rapidly and completely to evacuate the stomach. We then replace this large tube with a tube capable of being propelled through the intestinal canal and bring about consequent reduction in the distention and probable localization of the lesion. We prefer the Cantor tube for this purpose because of the ease of its insertion and handling. As soon as the first manipulative procedures to get the tube into the duodenum have been carried out the scout film of the abdomen is made and administration of parenteral fluids is started. The selection of the fluids to be given is of course dependent upon one's impression of the physical status of the patient and the degree of his metabolic disturbance. It is not uncommon to administer simultaneously plasma and dextrose-saline solutions or amino acid-dextrose solution and blood.

We next instill through the Cantor tube 2 ounces of mineral oil and clamp the tube off for a one hour period. A 2 quart soapsuds enema is given to empty the colon entirely and discover the possible location of any obstruction and thereafter at 4 hour intervals an ounce of oil is given through the tube and it is clamped off for an hour during which time a tap water enema is given with the request that observance be made for the presence of feces, flatus, blood, or oil. Oxygen is administered by means of a mask to relieve distention by promoting the exchange of gases in the intestinal tract and to combat shock.

An attempt is made to reduce external herniae by gentle taxis if bowel sounds can be heard in the hernial sac and if there is no discoloration or undue tenderness present. The patient is put in such a position that the effect of gravity upon the involved segment of gut and its content can come into play, then the hernial ring is firmly fixed while pressure from the most external portion of the hernia is

carried out continuously and gently in the proper direction. It is well to remember that the sac in a femoral hernia curves anteriorly and superiorly through the fossa ovalis. The opportune time to operate successfully on an external hernia is when the general status of the patient and the local condition of the tissues is optimum for primary healing. This is certainly not the case when bowel has been obstructed in the hernial sac and the diffusion of fluids, proteins and bacteria has occurred into the surrounding tissue with resultant edema, infection and diminished vascularity. If one is successful in reducing the hernia by taxis the same regime as utilized in the postoperative care of an operative case of intestinal obstruction should be utilized and in addition saline enemas are given every 4 hours until one is sure that he has not reduced a nonviable loop or an unrelieved obstruction.

In bringing about restoration of the metabolic balance of the patient it is well to remember that in a period of 24 hours 5 to 7 liters of secretion take place into the upper intestinal tract. This includes the gastric and pancreatic juices, bile and intestinal secretions. If these are entirely lost by vomiting, stagnation or aspiration it is easy to see that in a very short time an extremely large quantity of fluid and contained electrolytes will disappear from the body. One should also remember that a lack of oxygen increases the permeability of capillary walls to plasma proteins and, therefore, a further loss of fluid into the bowel will occur.

Relative anoxia is present in intestinal obstruction due to the upward pressure on the diaphragm reducing the vital capacity of the lungs as well as reduced blood circulation in distended bowel. Fine, in 1935 showed the beneficial use of 95 or 100 per cent oxygen in ileus.[4] Lars Troell calls attention to the fact that it is probably best to use alternating 100 per cent oxygen and a mixture of 60 per cent oxygen with 40 per cent helium. He believes also that it is best to use a low carbon dioxide content to effect gas diffusion from the intestine as rapidly as possible. It is an interesting fact that when rabbits are given 100 per cent oxygen to a point which could be called poisoning one notices a reduction of intestinal motility.[5]

The choice of anesthesia is one of the most important phases to be considered in surgery of intestinal obstruction. One must of course take into consideration the general physical status of the patient and the presence of complicating illnesses, but in general one would state that the agent should be the least noxious available and given in the least quantity absolutely essential to secure adequate relaxation. In most instances we are sure this will be found to be a low spinal anesthesia either of the single dose or preferably of frac-

tional dosage type. Curare used in conjunction with an inhalation or intravenous agent is of inestimable value. Preoperatively adequate sedation should be administered and during the operative procedure accurate, constant observation of the patient must be maintained so that necessary steps can be taken to prevent undue depression of the respiratory or circulatory systems, or, if depression occur, to alleviate it promptly.

If one's conclusions are correct from a careful perusal of the history, physical findings and laboratory data it should be possible to make an incision very near the site of the obstruction and with the least amount of trauma and evisceration the site of obstruction should be localized and freed or bypassed. The easiest way to find the site of obstruction is to look for deflated bowel and then follow it cephalad to the site of obstruction. Careful study of the state of vascularity of the bowel should be made and if there is any question as to the viability papaverine hydrochloride may be given intravenously, the involved bowel wrapped in warm saline packs, and 100 per cent oxygen administered to improve or restore circulation. Infiltration of the root of the mesentery with from 10 to 30 c.c. of 1 per cent novocaine can be carried out to effect local sympathetic block as an adjunctive procedure to increase circulation and intestinal motility.[6]

These measures relieve arteriolar spasm which comes reflexly to the capillary endothelium due to the distention of the bowel wall, anoxia and inflammation. If facilities are available and the viability is still in doubt it is very nice to inject 5 per cent fluorescein and observe the bowel under ultraviolet light at which time viable areas will have a green fluorescence and the gangrenous area will have no color whatsoever. If one has to deal with a gangrenous area, it is far better to resect under aseptic conditions the involved segment rather than to invert because it has been found this latter procedure in a large percentage of the cases will cause obstruction to persist and leakage to occur at the site of inversion. We prefer end-to-end anastomosis as the dangers of a long proximal blind loop after side-to-side anastomosis are great.[7] Among the procedures one may find it necessary to perform are release of bands (which should be removed as completely as possible with ligation and avoidance of raw areas), reduction of volvulus or intussusception. In these latter two conditions one must determine the etiology if possible and remove bands, diverticulae or pedunculated tumors as well as plicate the mesentery or suture the bowel so that recurrence will not be likely to take place. Removal of foreign bodies, and repair of herniae are performed in the usual fashion.

A very ingenious method has been recently described[8] whereby it is possible to resect a gangrenous loop of bowel involved in a femoral hernia without risk of the contaminated hernial sac content or spillage from the gangrenous loops soiling the peritoneal cavity. Enterostomy is to be avoided if possible, especially in infants. In cases of complete obstruction of the large bowel due to carcinomatous masses it is advisable to perform cecostomy by the McNealy technic under local anesthesia. Workers at Massachusetts General Hospital have recently reported[9] the use of a Miller-Abbott tube through a cecostomy for decompression and preparation of the bowel for secondary operations. This seems a very rational procedure.

After operation one must give strict attention to the maintenance of fluid and metabolic balance and continue the decompression until the bowel has regained its tone and is able to function normally. We are not in favor of the use of any intestinal stimulant such as pituitrin or prostigmin because the bowel cannot be forced to function before it has regained its tone, the edema has subsided, and there is a place of ready egress for the contents of the obstructed bowel. Circumstances for the rapid primary healing of the operative wound must be provided, thus close attention to the administration of protein precursors by blood, plasma or amino acid infusion or oral feedings of protein hydrolysates must be remembered. Supplementary minerals and vitamins are also important as are the use of antibiotic agents and sulfonamides to reduce infection and inflammation.

In the debilitated patient who has suffered marked depression of his circulatory system it is wise to be very diligent in the search for the onset of phlebothrombosis so that prompt anticoagulant therapy can be started. When one uses interrupted steel wire sutures for the closure of the abdominal wall and adequately fortifies his closure with retention sutures early ambulation is beneficial. This promotes peripheral circulation and increases aeration of the lungs as well as encouraging intestinal motility and increasing the sense of well being of the patient.

In conclusion one can state that the outlook of intestinal obstruction therapy is improving but can be further enhanced only by the early establishment of correct diagnosis including the site, degree, duration and probable cause. An adequate restorative or preoperative management carried out as rapidly as possible should then be accomplished. The surgical phase of treatment is extremely important from the standpoint of anesthesia and selection of procedure. Close attention to detail and postoperative management will

increase the number of surgical triumphs we are all anxious to achieve.

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PRIMARY CARCINOMA OF LIVER

Report of a Case Living and Well 25 Months After Left Hepatectomy

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PRIMARY carcinoma of the liver is being diagnosed more and more frequently prior to operation and autopsy. There have been almost 1300 cases reported in the literature, with the average incidence of 0.1 per cent found in autopsies in the United States. Autopsy, exploratory laparotomy and aspiration biopsy are the only certain diagnostic procedures. It is the consensus that no patient with primary carcinoma of the liver lives longer than 4 to 5 months, if untreated.

With a plea for earlier diagnosis and more radical surgery, we are presenting a case of primary liver cell carcinoma, because the patient is alive and well more than 25 months following a resection of the left lobe of his liver.

CASE REPORT

Chief Complaint. R. S., a 65 year old white male, entered the hospital Nov. 6, 1946, complaining of anorexia, weakness and a mass in the epigastrium for approximately 3 months.

Family and Past History. The patient stated that his mother died at the age of 64 of a malignant growth of the stomach. His past history is unimportant, except for acute exacerbations of chronic alcoholism over a period of 15 years.

Present Illness. Approximately 2 to 3 months before admission to the hospital, this patient had noted a gradual onset of anorexia, weakness and weight loss. There had been a dull aching, epigastric pain, not associated with meals, but with occasional vomiting. He accidentally discovered a mass in his epigastrium, but did not consider it significant. Because of a weight loss of 12 pounds, he reported to the hospital for examination and treatment. There was no history of fever, jaundice, hematemesis, diarrhea or bloody stools.

Physical Examination. A well-developed, elderly male, who had always been thin, but showing evidence of recent weight loss, was found to be ambulant and in no apparent distress. His lungs were clear to percussion and auscultation, his heart was not enlarged, the rhythm was regular and there were no murmurs present. On abdominal examination there was a protrusion in the epigastrium. Filling this area was a mass which extended into the right hypochondrium and to a point one centimeter above the umbilicus. It was not freely movable or stony hard on palpation. There was tenderness on deep pressure. Genitalia and rectum were normal. There were no enlarged lymph

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nodes, and the remainder of the physical examination was negative. Temperature 98, pulse 80, respirations 18, blood pressure 130/78.

Laboratory and X-ray Studies. Hemoglobin 14.5 Gm., erythrocytes 4,800,000. Leukocytes 14,100. Differential: polymorphonuclears 62, lymphocytes 42, eosinophils 4. Urine—reaction, acid; specific gravity 1.017, albumen 1 plus, sugar negative; microscopic negative. Serum protein 7.5 mg. per cent. Albumin 6.0 mg., globulin 1.5 mg. A/G ratio 4. Blood nonprotein nitrogen 40 mg. per cent. Blood Wassermann and Kahn tests negative. Bleeding time 5 minutes. Coagulation time 1 minute. There was no retention of bromsulphalein dye. Serum bilirubin 0.6. Cephalin flocculation 2 plus. Serum amylase was normal.

X-ray of the chest was reported as showing normal heart and lungs. Gastrointestinal series disclosed no filling defects of the esophagus or stomach; the duodenal cap was normal in size and configuration; there was a ptosis of the stomach with the greater curvature reading the level of the lumbosacral joint; no 5 hour retention. Barium enema showed the transverse colon to be displaced downward also. The electrocardiogram was consistent only with left axis deviation.

Operation. The preoperative impression was an abdominal tumor, possibly pancreatic. On November 8, under gas-oxygen-ether anesthesia, the patient was explored through a long upper left rectus incision. On opening the peritoneal cavity a smooth globular tumor about the size of a grapefruit (8 to 10 cm. in diameter) presented itself in the wound. It occupied most of the left lobe of the liver and was both firm and cystic on palpation. Aspiration with a needle and syringe produced only a small volume of blood. The entire gastrointestinal tract, retroperitoneal organs and pelvic viscera were explored. No evidence of a possible site of primary malignancy was found. No implants were noted on the peritoneal surfaces or in the right lobe of the liver. It was decided that the mass was probably a primary liver tumor and that the left lobe should be resected. The round and falciform ligaments, as well as the left coronary ligaments between the liver and diaphragm were clamped and severed. The left branches of the hepatic artery and portal vein were carefully isolated and ligated separately with heavy catgut. The entire left lobe was then removed from the right by means of the electrocautery, after partially controlling the hemorrhage from the right lobe by means of overlapping heavy catgut interrupted mattress sutures. The raw surfaces were covered by suturing the falciform ligament to the liver and reinforcing one small area with oxycellulose to control the oozing. The abdomen was closed without a drain. Two pints of whole blood were given while the patient was on the table, and his condition remained good throughout the operation.

Pathology. The gross appearance of primary liver carcinomas is usually one of three types: massive, in which there is a solitary tumor mass situated in one of the lobes; nodular, consisting of multiple circumscribed nodules; and diffuse, wherein the tumor invades the entire organ.

In this case the tumor was the massive type. The pathologic report is as follows:

Gross Description: The specimen was round, 10 cm. in diameter, and weighed 600 Gm. A capsule surrounded about three quarters of the mass, and except for increased fibrosis in areas, it resembled the liver capsule. The cut surface, where the left lobe had been removed from the right, resembled

normal liver except for a slight increase in fibrous tissue. Centrally there was a cavity filled with blood-stained tissue of scrambled egg consistency.

Microscopic Description: The first sections made of the tumor suggested a myosarcoma. Other sections revealed areas that were very vascular, and here the tumor cells seemed to be developing outward from the central veins. Still other slides showed definitely that the tumor cells were evolving from the liver cells. This variation in topography, i.e., spindle type cells, cells appearing to develop from blood vessels, and cells evolving from liver cells was confusing until multiple sections were thoroughly studied. Another interesting feature was the tendency of the lobular pattern to be maintained. This suggested a mass malignant change on the part of the cells rather than expansion or infiltration. A number of areas showed fibrosis enmeshing bile ducts and liver cells. This, however, appeared spotty and was not proof of generalized cirrhosis.

Diagnosis: Carcinoma of liver, primary, left lobe.

Patient's postoperative course was uneventful. Daily intravenous glucose, saline, amino acids and large doses of vitamins were given, as well as oral feedings as tolerated. By the seventh postoperative day the patient was out of bed and ambulant; his incision healed by primary union. The symptoms of anorexia, nausea and gastric pain disappeared, and there was a marked subjective and objective improvement. A high protein, high carbohydrate diet was allowed and supplemented with vitamins. Within 3 months the patient gained 20 pounds in weight.

In May, 1948, this patient was ambulant and in no discomfort. He had experienced several bouts of acute alcoholism during the preceding 6 months. His weight had remained at its usual level. The physical examination otherwise was negative.

Laboratory examinations at that time revealed a normal blood count, including differential, and normal urine. Cephalin flocculation test 3 plus, icteric index 9.5, van den Bergh negative. Prothrombin time 15 seconds, bleeding and coagulation time normal. There was 10 per cent retention of bromsulphalein in 60 minutes.

X-ray studies of the chest, skull, spine, pelvis and long bones revealed no abnormal findings. A gastro-intestinal series showed slight downward and medial displacement of the first portion of the duodenum and the hepatic flexure of the colon. The displacement was suggestive of extrinsic pressure.

In December, 1948, there had been no appreciable change in this patient's condition, and he had gained another 12 pounds in weight. He had been under close surveillance for 25 months following his surgery.

Conclusion

This case has been of interest chiefly because of the patient's freedom from symptoms and the unusual longevity following complete left hepatectomy for primary liver cell carcinoma. It is presented to add emphasis to the healthy trend toward early radical surgery in such cases.

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THE SOUTHWESTERN SURGICAL CONGRESS
THE NEED—THE AIMS

THE NEED

During the organizational meeting of the Southwestern Surgical Congress, these questions were asked: Do we need another surgical society? Aren't we already over-organized? Won't it duplicate the work and facilities of existing organizations? The officers of the Southeastern Surgical Congress quoted figures to show that it would not detract from other organizations, and that there was a great need for another society.

The great Southwest is perhaps the only great region of the United States without a surgical organization of its own. In the nine states which comprise its territory, there are approximately 1,700 Fellows of the American College of Surgeons, and perhaps there are many others who are qualified to become members. The very size of this organization makes participation in it by its members, except for the very few, an impossibility. Intimacy and closeness to it, which produce personal pride in being a member, are lost. A small regional society is needed. It is true that such renowned surgical societies as the American Surgical, Western Surgical and

the Southern Surgical Associations have honored men in our territory with membership in their organizations, but the total membership in all these organizations in the entire nine states is less than 100, and some men belong to all three. This leaves 1,600 well qualified surgeons, who have, so to speak, no place to hang their hats. To fill this need is the reason for the Southwestern Surgical Congress.

THE AIMS

There are aims which this organization should hope to accomplish. Let me list them.

1. *Development of Talent.* In the field of sports, movies, and business, scouts are looking for promising young people who can be brought into their respective organizations and developed. This is true in the medical profession only to the very limited degree as practiced by the medical institutions. Once training has been attained, the young surgeon becomes an *individual.* There is no one to direct him, to encourage him, or to promote him. If he has a light, all too often it's hidden under the bushel. Actually there is a great deal of surgical talent which lies unexplored in the fields of general and specialty surgery. One of the aims of the Southwestern Surgical Congress should be to seek out the talent, encourage and promote its development, and to make live in these individuals the realization that they are a part of a great practicing-teaching group.

2. *Year-round Program.* Insofar as the membership goes in the great majority of medical and surgical organizations, it is similar to having Sunday religion. There are annual meetings, but then in the interval the membership has no duty to perform. A member of the Southwestern Surgical Congress should be encouraged to do clinical research throughout the year. He should keep statistical records of his work and submit pertinent data to the organization if and when called upon to do so. The Council could and should plan a course of study, based on problems of regional or national importance, in which the membership would be expected to participate. It should act as a counsellor in much the same manner as a professor does in the case of House Officers. At the appointed time the data could be assembled and tabulated. The result would give a true picture of what is happening in this particular subject or field of surgery, and not just the picture of large institutional practice. Because the members of the Southwestern Surgical Congress will be selected on the basis of training, integrity and practical experience, it is quite likely the combined statistics of these men will stand high in the minds of those who use them. Not only would this fur-

nish stimulating and creative work for the surgeon, but the information gained would be invaluable.

3. *Registry of Rare and Unusual Cases.* It has been said "Beware of the man who reports a single case." This saying has reference to the danger inherent in reaching a conclusion based on limited material. For this and other reasons, many surgeons have kept hidden in their files rare and unusual cases. One of the aims of the Southwestern Surgical Congress should be to maintain a registry for the rare and unusual cases, a complete record of which could be submitted by any of its members. It seems to me it would promote a more careful study of cases, and in a short time the registry would have a sufficient number on which to base an interesting and informative report.

4. *Pathologic Museum.* The fourth aim is that the Congress will start and maintain a museum of microscopic slides of normal and pathological tissue. In connection with it, kodachrome slides of gross pathology could be maintained. I believe this has been done by no other society, and should prove invaluable. It is hoped also that this and other material will be made available for study to any interested doctor or student.

In this, and in other ways, the Southwestern Surgical Congress may aid our fine and well established institutions in postgraduate medical training.

LOUIS P. GOOD, M.D.

The Southern Surgeon, the second regional journal devoted to a specialty in the United States, is published by The Southern Surgeon Publishing Company, a subsidiary of The Southeastern Surgical Congress, for the advancement of surgery particularly in the South. In addition to publishing papers presented before the Postgraduate Surgical Assembly of The Southeastern Surgical Congress, it welcomes good surgical papers regardless of their geographic origin. It aspires to encourage surgeons in the Southern States, especially the younger ones, to record their own observations and original work.

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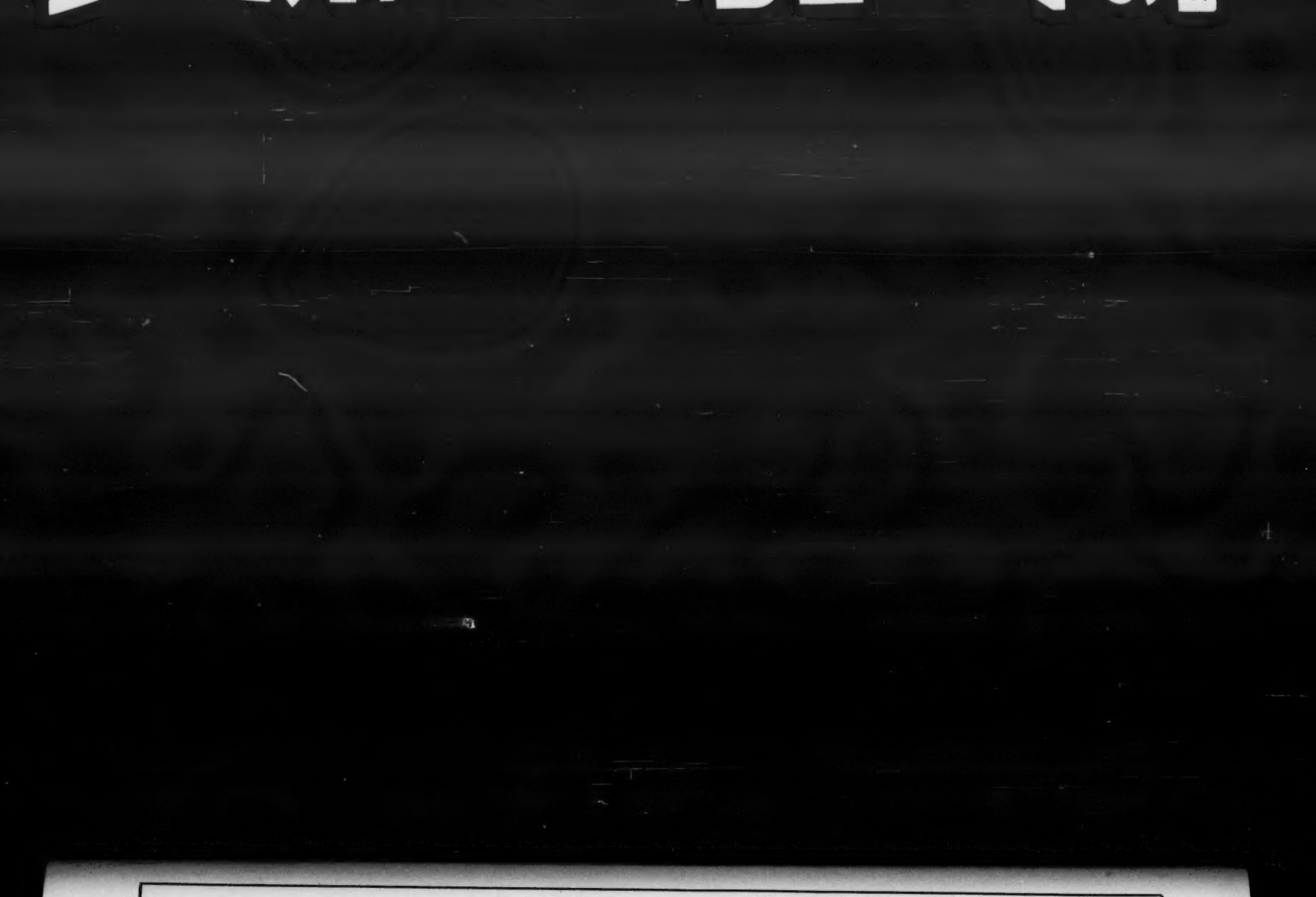
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